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

Considered
at a meeting of the University Academic Council
protocol No. 15
from "30" 05 2019

APPROVED
Chairman of the Board
"S.Seifullin Kazakh AgroTechnical University "
_____ A.K. Kurishbayev
"30" 05 2019

EDUCATIONAL PROGRAM
"Agroecology"

Code and classification of the area of education:
6B05 - Natural sciences, mathematics and statistics
Code and classification of training program:
6B052 - Environment
Code in the International Standard Classification of Education: 0520
Qualification: Bachelor of Natural Science

Duration of study: 4 years

Nur - Sultan 2019

Authors:

Name	Academic degree, title, position, place of work
Satybaldiyeva Gulmira Kalmashevna	Candidate of Biological Sciences, Docent, Head of the Department of Ecology, S.Seifullin KATU
Bakhov Zhumabek Kubeyevich	Doctor of Technical Sciences, Professor of the Department of Ecology, S.Seifullin KATU
Ismailova Aigul Amanzholovna	Doctor of Medical Sciences, Professor, Department of Ecology, S.Seifullin KATU
Kuatbayev Askhat Tezekbayevich	Candidate of Biological Sciences, Docent of the Department of Ecology, S.Seifullin KATU
Nurbayeva Naila Abilhasanovna	Candidate of Technical Sciences, Docent of the Department of Ecology, S.Seifullin KATU
Satova Karlygash Mukashevna	Candidate of Technical Sciences, Docent of the Department of Ecology, S.Seifullin KATU
Shupshibayev Kazbek Kamaliyevich	Candidate of Biological Sciences, Docent of the Department of Ecology, S.Seifullin KATU
Utarbayeva Aizhan Sharelevna	Candidate of Biological Sciences, Docent of the Department of Ecology, S.Seifullin KATU
Zhaglovskaya Alina Aleksandrovna	PhD, Senior Lecturer of Department of Ecology, S.Seifullin KATU

The team of authors is approved by order of JSC "S. Seyfullin KATU"
№ _____ from _____

Educational program "Agroecology"
considered at a meeting of the Department of Ecology
Protocol No. 9 9 of "28" 04 2019,
approved by faculty council
Protocol No. 9 "28" 05 2019

Dean of Agronomic faculty _____ Stybayev G.Zh.

Head of Ecology Department _____ Satybaldiyeva G.K.

Content

1 Passport of the educational program

1.1 The purpose of the educational program:

The main goal of the educational program is to meet the needs of society in qualified personnel by training specialists in the field of agriculture and biological resources, who are able to assess the ecological state of agrocenoses in modern conditions and reduce the impact of the growing technogenic load on agricultural territories and the agro-industrial complex.

The objectives of the educational program:

1. The formation of basic professional competencies among future specialists in the field of agriculture and biological resources.
2. Training in methods for assessing the state of the environmental situation in the agricultural sector caused by industrial and agricultural pollution.
3. Mastering modern methods of preventing, reducing and eliminating the degradation of agricultural production facilities and putting into practice measures to restore ecological balance in the agricultural sector.
4. The study of the combination of scientific and technological progress in agriculture with the progressive development of the natural environment and the ecologization of production processes in order to ensure balanced dynamic development and reduce or prevent anthropogenic pressure on agriculture.
5. The ability to work with scientific and technical information, use domestic and foreign experience in professional activities, systematize and summarize the information received.
6. Training of specialists with a clear orientation to the future, which is manifested in the possibility of building their professional career and education, taking into account success in personal and professional activities that meet the requirements of employers.

2 General characteristics of the educational program (relevance, features, competitive advantages, uniqueness, stakeholders, etc.)

The development of this educational program is associated with increasing anthropogenic pressure on the environment, including in the field of the agricultural sector. The agricultural sector of Kazakhstan has great potential and non-compliance with environmental standards in the production of agricultural products will lead to irreversible socio-economic and technological disasters. In order to ensure balanced dynamic development, as well as reduce or prevent anthropogenic pressure on the environment, future specialists in the field of agriculture and biological resources should possess the complex of knowledge offered in this educational program.

The modular educational program “Agroecology” was developed in accordance with the National Qualifications Framework, agreed with the Dublin Descriptors and the European Qualifications Framework, and was designed on the basis of a modular system for studying disciplines that form general cultural and professional competencies.

The peculiarity of the educational program is that it is interdisciplinary and lays the foundations necessary for the sustainable and environmentally safe development of agriculture, as an industrial basis for the development of rural territories.

3 Competency model (portrait) of a graduate

3.1 Areas of professional activity

The bachelor's professional activity is in the production, management, research and educational field, assessment of the ecological situation of the environment, quality control of the natural environment and human health, development of measures to prevent, reduce and eliminate the degradation of agricultural production facilities (soil, water, air, plant) and in practice, measures to restore ecological balance in the agricultural sector.

3.2 Types of professional activity

3.2.1 Objects of professional activity

The objects of professional activity of graduates are: soil, water, air, plants, animals and agricultural products, agricultural complexes, energy facilities, educational institutions, research institutes and centers.

3.2.2 Professional subject

The subjects of professional activity are: natural and agricultural ecosystems and their components; biosphere and its components; environmental monitoring and marketing; analysis, inspection and control of the environment; compilation of econometric models; management and expert functions in the field of environmental protection; environmental education and upbringing; compliance with environmental requirements in the field of agriculture and in the design of new enterprises, settlements, planning and implementation of environmental measures in various sectors of the economy, environmental impact assessment (EIA) and environmental audit.

3.2.3 Areas of professional activity

Bachelors can perform the following types of professional activities: organizational and managerial; production and technological; service and operational; experimental research; educational; design. Students in the framework of the educational program "Agroecology" must be proficient in instrumental methods of analysis of environmental objects, methods of bioindication of soil and water quality, environmental mapping and GIS technologies, environmental impact assessment and the development of environmental documentation at agricultural enterprises.

3.3 General educational competencies:

- argue their own assessment of everything that happens in the social and industrial spheres and use the methods and techniques of historical description to analyze the causes and consequences of the events of modern history of Kazakhstan;
- assess situations in various areas of interpersonal, social and professional communication, taking into account the basic knowledge of sociology, cultural studies and psychology;

- demonstrate personal and professional competitiveness;

- apply in practice knowledge in the field of social sciences and humanities, which is internationally recognized and summarize the results of the study;

- have communication skills in oral and written forms in Kazakh, Russian and foreign languages for solving problems of interpersonal, intercultural and production (professional) communication;

-use in personal activities various types of information and communication technologies.

3.4 Basic competencies:

- apply at a professional level their knowledge, understanding and ability to solve problems in a new environment, in a wider interdisciplinary context;

- collect and interpret information to form judgments taking into account social, ethical and scientific considerations;

- clearly and unambiguously communicate information, ideas, conclusions, problems and solutions, both to specialists and non-specialists;

- have the training skills necessary for independent continuation of further education in the field of study;

-work with other specialists in joint projects and events;

- Demonstrate teamwork, negotiation and organization skills;

-represent work in an accessible form;

- to accept positively innovations and changes.

3.5 Professional competencies:

- know and understand the technology, means and methods of agroecology that increase the productivity and sustainability of agroecosystems, the physicochemical methods of rapid analysis to monitor changes in the quality of the environment, diagnose its pollution and recommend effective ways to disinfect harmful industrial wastes;

- to predict the ecological condition of the area on the basis of evidence and timely prevention of negative anthropogenic impacts;

- to develop and implement recommendations for the processing of production waste and improvement of existing production facilities in order to ensure their environmental safety in relation to human health and the environment, sanitary and health measures, fire equipment for the agricultural sector, taking into account environmental and economic parameters;

- use the knowledge about the agricultural sector to organize their rational use and determine measures to reduce the anthropogenic impact on the territory;

- Conducting research, development and experimentation in research institutions of the agricultural sector;

- analyze and evaluate the dynamics of environmental processes associated with anthropogenic impact and natural disasters;

- analyze and evaluate possible ways to restore disturbed rural areas;

- know and use in practice the principles of organizing environmental impact assessment of rural areas, industries and technological projects.

4 Bases of practice

The following types of practices are envisaged in the Agroecology educational program: educational practice in general ecology, educational practice in the ecology of animals and plants, industrial practice and undergraduate practice.

Students under this educational program can take internships at various agricultural enterprises and organizations, on agricultural lands of farms of various forms of ownership, Astana Ormany JSC, national natural parks, natural resources departments and environmental management agencies, regional territorial inspectorates and other state institutions.

5 Structure of the educational program

№	The name of the cycles and disciplines	General complexity	
		in academic hours	in academic credits
1	2	3	4
1	The cycle of general education disciplines		
1)	Mandatory component		
	The modern history of Kazakhstan	150	5
	Philosophy	150	5
	Foreign language	300	10
	Kazakh (Russian) language	300	10
	Information and communications technology (in English)	150	5
	The module of socio-political knowledge (sociology, political science, cultural studies, psychology)	240	8
	Physical Culture	240	8
2)	University component		
	Fundamentals of economic theory and law	150	5
2	The cycle of basic disciplines		
1)	University component		
	English for special purposes	180	6
	Professionally-oriented foreign language	90	3
	Integrated Plant Protection	150	5
	Green Economy and Climate Change	150	5
	General ecology	210	7
	General Ecology Practice	90	3
	Agrochemistry and soil science	150	5
	Environmental monitoring	150	5
	Internship		5
	Undergraduate practice		12
2)	Optional component		
	Environmental aspects of natural sciences	150	5
	General chemistry	150	5
	Livestock processing technology	150	5
	Sustainability and Agroecosystem Management	150	5
	Geoecology	150	5
	Environmental safety of agricultural products	150	5
	Integrated water resources management	150	5
	Ecological methods of analysis in the agricultural sector	150	5
	GIS technology in agriculture	150	5
	Protection and rational use of biological resources of rural areas	150	5
	Ecology of plants, animals and microorganisms	150	5
3	The cycle of core disciplines		
1)	University component		

	Technology of crop production	150	5
	Landscape Ecology	150	5
	Environmental laws and documentation in agriculture	150	5
	Agrometeorology	150	5
	Practice by agrometeorology	30	1
	Protection of atmospheric air	150	5
	Ecological, hygienic regulation and expertise in agriculture	150	5
	Soil protection	150	5
	Organic Agriculture	150	5
	Methods of processing and disposal of agricultural waste	150	5
2)	Optional component		
	Rational nature management in agriculture	150	5
	Fundamentals of agribusiness and entrepreneurship	150	5
	Environmental economics	150	5
1)	Writing and defending a thesis (project) or preparing and passing a comprehensive exam	360	12

Казахский агротехнический университет имени С.Сейфуллина

Рассмотрено на заседании
Ученого совета университета

Протокол №15 от "30" 05 2019 г.

УТВЕРЖДАЮ:
Директор Департамента по академическим вопросам
АО «КАТУ им. С.Сейфуллина»
_____ Н.А. Серекпаев
"03" 05 2019 г.

Академический календарь на 2019-2020 учебный год для специальностей бакалавриата агрономического факультета

Курс	Авг	Сентябрь				Октябрь				Ноябрь				Декабрь				Январь				Февраль				Март				Апрель				Май				Июнь					Июль				Август				
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ПН - презентационная неделя
• - теоретическое обучение
ЗД запись на дисциплины
ЭС- сдача FX
С - сессия экзаменационная

Л - летний семестр
Уп - учебная практика
Пр - производственная практика

Пд - преддипломная практика

К - каникулы
ВС - военные сборы
Д - дипломное проектирование
О - обзорные лекции
ИА итоговая аттестация

Праздничные дни:
30 августа - День Конституции
31 июль- Курбан Айт
1 декабря - День Первого Президента
16, 17 декабря - День Независимости
1, 2 января - Новый год
7 января - Рождество Христово

8 марта - Международный женский день
21, 22, 23 марта - Наурыз мейрамы
1 мая - Праздник единства народа Казахстана
7 мая - День защитника Отечества
9 мая - День Победы
6 июля - День столицы

Всего недель:
теоретическое обучение - 30 недель
экзаменационная сессия - 6 недель
каникулы зимние - 2 недели
каникулы летние - 4-6 недель
летний семестр - 4-6 недель

Декан факультета _____ "___" _____ 2019 г.

Зав.кафедрой _____ "___" _____ 2019 г.
Зав.кафедрой _____ "___" _____ 2019 г.
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Министерство сельского хозяйства Республики Казахстан
Казахский агротехнический университет им.С.Сейфуллина

Рассмотрено
на заседании Ученого
совета университета
Протокол № 15
„30„ 05 2019 г.

УТВЕРЖДАЮ
Первый заместитель
председателя Правления
АО "КАТУ"
Абдыров А.М.
„30„ 05 2019 г.

РАБОЧИЙ УЧЕБНЫЙ ПЛАН

на 2019-2023 учебные годы
для Модульной образовательной программы "Агроэкология"
по специальности В051 – Окружающая среда
Академическая степень: Бакалавр
Форма обучения: Очное (бакалавр 4 года) триместр
Год поступления: 15-08-2019

Шифр модуля	Наименование модуля	Цикл дисциплины	Компонент дисциплины	Код дисциплины	Наименование дисциплины	Академические кредиты	Семестр изучения	Контроль по	Количество часов						Распределение кредитов по курсам и семестрам											
										Аудиторная работа			СРО		1 курс			2 курс			3 курс			4 курс		
								Экзамены (семестр)*	Всего	Лекции	Лабораторные	Практические	СРОП	СРО	1 сем	2 сем	3 сем	4 сем	5 сем	6 сем	7 сем	8 сем	9 сем	10 сем	11 сем	12 сем
															недель в семестре											
															10	10	10	10	10	10	10	10	10	10	10	10
Общие модули																										
1	Общеобразовательные дисциплины	Д	ОК	PS 1101	Политология и социология	4	1	1	4/120	1,3/20		1,3/20	16	64	4.0											
2		Д	ОК	IKT 1100	технологии	5	1	1	5/150	1,3/20	2/30.0		20	80	5.0											
3		Д	ОК	KRYa 1100	Казахский (русский) язык	3	1	1	3/90			2/30	12	48	3.0											
4		Д	ОК	IYa 1100	Иностранный язык	4	1	1	4/120			2,7/40	16	64	4.0											
5		Д	ОК	SIKG 1100	(ГЭ)	5	1	1	5/150	1,3/20		2/30	20	80	5.0											
6		Д	ОК	FK 1104	Физическая культура.	2	1		2/60			4/60	0	0	2.0											
7		Д	ОК	KP 1102	Культурология и психология	4	2	2	4/120	1,3/20		1,3/20	16	64		4.0										
8		Д	ВК	OETP 1103	права	5	2	2	5/150	1,3/20		2/30	20	80		5.0										
9		Д	ОК	KRYa 1100	Казахский (русский) язык	3	2	2	3/90			2/30	12	48		3.0										
10		Д	ОК	IYa 1100	Иностранный язык	3	2	2	3/90			2/30	12	48		3.0										
11		Д	ОК	FK 1105	Физическая культура.	1	2		1/30			2/30	0	0		1.0										
12		Д	ОК	IYa 1110	Иностранный язык	3	3	3	3/90			2/30	12	48			3.0									
13		Д	ОК	KRYa 1111	Казахский (русский) язык	4	3	3	4/120			2,7/40	16	64			4.0									
14		Д	ОК	FK 1106	Физическая культура.	1	3		1/30			2/30	0	0			1.0									
15		Д	ОК	Fil 2100	Философия	5	4	4	5/150	1,3/20		2/30	20	80				5.0								
16		Д	ОК	FK 2107	Физическая культура.	1	4		1/30			2/30	0	0				1.0								
17		Д	ОК	FK 2108	Физическая культура.	2	5		2/60			4/60	0	0					2.0							
18		Д	ОК	FK 2109	Физическая культура.	1	6		1/30			2/30	0	0						1.0						
19		БД	ВК	OE 1232	Общая экология	4	3	3	4/120	1,3/20		1,3/20	16	64			4.0									
Модули специальности/образовательной программы																										
20	Экологическое образование	БД	ВК	OE 1205	Общая экология	5	2	2	5/150	1,3/20		2/30	20	80		5.0										
21		БД	ВК	UPPDOE 1212	"Общая экология"	2	3		2/0				0	0			2.0									
22		БД	КВ	ERZhM 2222	Экология растений, животных и микроорганизмов	7	6	6	7/210	2/30		2,7/40	28	112							7.0					
23		БД	ВК	UPPDOE 2212	Учебная практика по дисциплине "Общая экология"	3	6		3/0				0	0							3.0					

24		ПД	ВК	TPPR 2314	Технология переработки продукции растениеводства	5	4	4	5/150	1,3/20		2/30	20	80				5.0											
25		ПД	ВК	LE 3315	Ландшафтная экология	5	8	8	5/150	1,3/20		2/30	20	80									5.0						
26	Промышленная экология и документация на предприятиях	БД	КВ	EAE 1226	Экологические аспекты естествознания	2	3	3	2/60	0,7/10		0,7/10	8	32			2.0												
27		БД	КВ	EAE 2233	Экологические аспекты естествознания	4	4	4	4/120	1,3/20		1,3/20	16	64				4.0											
28		ПД	ВК	EZDSH 3314	Экологические законы и документация в сельском хозяйстве	5	9	9	5/150	2/30		1,3/20	20	80										5.0					
29	Языковый	БД	ВК	AYaDSC 2231	Английский язык для специальных целей 1	6	4	4	6/180			4/60	24	96				6.0											
30		БД	ВК	POIYa 2206	Профессионально-ориентированный иностранный язык	3	4	4	3/90			2/30	12	48				3.0											
31	Защита растений	БД	ВК	IZR 2208	Интегрированная защита растений	5	5	5	5/150	2/30		1,3/20	20	80					5.0										
32	Общая химия	БД	КВ	OH 2223	Общая химия	5	5	5	5/150	1,3/20	2/30.0		20	80					5.0										
33	Технология животноводства	БД	КВ	TPPZh 2230	Технология переработки продукции животноводства	5	5	5	5/150	1,3/20		2/30	20	80					5.0										
34	Основы системной экологии и изменение климата	БД	ВК	IKZE 2211	Изменение климата и зеленая экономика	4	6	6	4/120	1,3/20		1,3/20	16	64						4.0									
35		БД	КВ	URUA 3220	Устойчивое развитие и управление агроэкосистемами	5	7	7	5/150	2/30		1,3/20	20	80							5.0								
36		БД	КВ	Geo 3221	Геоэкология	5	9	9	5/150	2/30		1,3/20	20	80									5.0						
37		ПД	ВК	Agr 2309	Агрометеорология	4	6	6	4/120	1,3/20		1,3/20	16	64						4.0									
38		ПД	ВК	UPPDA 2310	Учебная практика по дисциплине "Агрометеорология"	1	6		1/0				0	0						1.0									
39		ПД	ВК	OAV 3314	Охрана атмосферного воздуха	5	7	7	5/150	2/30		1,3/20	20	80							5.0								
40	Почвоведение и агрохимия	БД	ВК	AP 3213	Агрохимия и почвоведение	5	7	7	5/150	1,3/20	2/30.0		20	80							5.0								
41	Экологический мониторинг, ГИС и экспертиза	БД	ВК	EM 3215	Экологический мониторинг	5	7	7	5/150	2/30		1,3/20	20	80							5.0								
42		БД	КВ	EBS 3227	Экологическая безопасность сельхозпродукции	5	8	8	5/150	2/30		1,3/20	20	80									5.0						
43		БД	КВ	IUVR 3200	Интегрированное управление водными ресурсами	5	8	8	5/150	2/30		1,3/20	20	80									5.0						
44		БД	КВ	EMAA 3228	Экологические методы анализа в агросекторе	5	9	9	5/150	2/30		1,3/20	20	80										5.0					
45		БД	КВ	GTSH 4229	ГИС технологии в сельском хозяйстве	5	10	10	5/150	2/30		1,3/20	20	80											5.0				
46		ПД	ВК	EGNESH 4317	Экологическое, гигиеническое нормирование и экспертиза в сельском хозяйстве	5	10	10	5/150	2/30		1,3/20	20	80											5.0				
47	Рациональное использование и охрана природных ресурсов	БД	КВ	ORIBRST 3219	Охрана и рациональное использование биологических ресурсов сельских территорий	5	8	8	5/150	2/30		1,3/20	20	80									5.0						
48		БД	ВК	PP 3209	Производственная практика	5	9		5/0				0	0										5.0					
49		БД	ВК	PP 4210	Преддипломная практика.	4	11		4/0				0	0												4.0			
50		БД	ВК	PP 4210	Преддипломная практика.	8	12		8/0				0	0															8.0
51		ПД	ВК	OP 4308	Охрана почв	5	10	10	5/150	2/30		1,3/20	20	80											5.0				
52		ПД	ВК	OSH 4316	Органическое сельское хозяйство	5	10	10	5/150	2/30		1,3/20	20	80											5.0				
53		ПД	ВК	MPUSO 4307	Методы переработки и утилизации сельскохозяйственных отходов	5	11	11	5/150	2/30		1,3/20	20	80												5.0			
54	Экономика и предпринимательская деятельность	ПД	КВ	RPSH 3313	Рациональное природопользования в сельском хозяйстве	5	8	8	5/150	1,3/20		2/30	20	80									5.0						
55		ПД	КВ	OAP 4312	Основы агробизнеса и предпринимательства	5	11	11	5/150	2/30		1,3/20	20	80												5.0			

56		ПД	КВ	EP 4300	Экономика природопользования	6	11	11	6/180	2/30		2/30	24	96											6.0				
Дополнительные модули, выходящие за рамки квалификации																													
Модули по выбору																													
Средняя недельная нагрузка в часах															69	63	48	72	51	60	60	75	60	60	60	24			
	1				Общеобразовательные дисциплины(ООД)	56		12	1680	120	30	570	192	768	23	16	8	6	2	1	0	0	0	0	0	0				
					Обязательный компонент(ООД/ОК)	51		11	1530	100	30	540	172	688	23	11	8	6	2	1	0	0	0	0	0	0				
					Вузовский компонент(ООД/ВК)	5		1	150	20	0	30	20	80	0	5	0	0	0	0	0	0	0	0	0	0				
					Компонент по выбору(ООД/КВ)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	2				Базовые дисциплины(БД)	117		20	2850	450	60	440	380	1520	0	5	8	13	15	14	15	15	15	5	4	8				
					Обязательный компонент(БД/ОК)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
					Вузовский компонент(БД/ВК)	59		8	1110	140	30	200	148	592	0	5	6	9	5	7	10	0	5	0	4	8				
					Компонент по выбору(БД/КВ)	58		12	1740	310	30	240	232	928	0	0	2	4	10	7	5	15	10	5	0	0				
	3				Профилирующие дисциплины(ПД)	61		12	1800	320	0	280	240	960	0	0	0	5	0	5	5	10	5	15	16	0				
					Обязательный компонент(ПД/ОК)	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
					Вузовский компонент(ПД/ВК)	45		9	1320	240	0	200	176	704	0	0	0	5	0	5	5	5	5	15	5	0				
					Компонент по выбору(ПД/КВ)	16		3	480	80	0	80	64	256	0	0	0	0	0	0	0	5	0	0	11	0				
Итого по учебному плану						234			3750	490	60	860	468	1872	23	11	10	10	12	8	5	20	10	5	11	0			

4	Дополнительные виды обучения		Количество кредитов	Семестр	Количество часов	Количество недель
4.1	Модули профессиональной практики, в т.ч.					
	Учебная практика		6	3, 6	180	6
	Преддипломная практика		12	11, 12	360	12
	Производственная практика		5	9	150	5
	Итого по практике		23		690	23.0
4.2	Модуль Физической культуры		0		0	
	Итого		23		690	23.0
5	Модуль итоговой государственной аттестации (МИГА)	ГЭ по специальности	0			
		Написание и защита дипломной работы	12	12		
	Итого		12			

Директор ДАВ — Серекпаев Нурлан Амангельдинович

Начальник отдела планирования и организации учебного процесса — Солтан Гульжан Жексембаевна

Декан факультета — Стыбаев Гани Жасымбекович

Заведующая кафедрой — Сатыбалдиева Гульмира Калмашевна

Appendix 3 Description of the disciplines of compulsory and university components

1. Basic information about the discipline:	
Name of the discipline	**Foreign language**
2. The number of credits	**10**
3. Prerequisites:	Basic school knowledge
4. Post requisites:	Professionally-oriented foreign language
5. Competencies:	According to the results of mastering the program, the student has the following competencies: - systematizes the conceptual basis for understanding the communicative intentions of the partner, the authors of texts at this level; - compares and selects the forms and types of speech / communication appropriate to the communicative intention with a logical construction adequate to the type of speech; - adequately expresses its own communicative intentions with the correct selection and appropriate use of appropriate language means, taking into account their compliance with the socio-cultural norms of the language being studied; - classifies the levels of use of real facts, links to authoritative opinion; speech behavior is communicatively and cognitively justified; - reveals the patterns of development of a foreign language, paying attention to the study of stylistic identity; - owns the techniques of linguistic description and analysis of the causes and consequences of events in texts of a scientific and social nature; - expresses in a foreign language possible solutions to modern problems based on the use of reasoned information; - Evidently uses linguistic material with reasoned linguistic means sufficient for a given level, timely and independently corrects errors in 75% of error-free statements; - owns the strategy and tactics of constructing a communicative act, correctly arranges speech intonationally, relying on lexical sufficiency in the framework of speech subjects and grammatical correctness.
6. Course author	Department of Foreign Languages
7. Basic literature	1. Bonk NA, Koty GA, Lukyanova GA Tutorial English Language, Part 1. - M: 1996. 2. Golitsynsky Yu. Grammar. Setting up the task. -Sank-Petersburg, 2007. 3. Kachalova KN, Israilev EE Practical grammar in English language skills. - M: 1997. 4. Savelev LA Textbook English "Englishforthe StudentofEcology" for environmentalists. - PSB: ed. RGGUU, 2007 - 148 p. 5. Saspugayeva G.Y. Ecology. Textbook S. Seifullin Kazakh Agrotechnical University, 2015, -179 pages. 6. Ivanova NK English for chemists (Phonetics). -Ivanovo, "IGHTTU", 2007, -100 pp. 7. Kutepova MM - Theworldofchemistry / English for chemists: Textbook: Ed. 4th -M.: Cd University, 2006. -256s. 8. Serebrrennikova EI, Kruglyakova I.E. English for chemists: Textbook: Ed. 3rd e. -M.: Alliance, 2009. -400 pp. 9. Timofeeva T.V., Potaliu LV Technical Correspondence: Textbook in English - Voronezh: Searching for WGU, 2005. - 27 pp. 10. K. Harding. Englishfor Specific Purposes. Oxford University Press, 2009. 11. AkimovaT.A. Ecology. Man - Economy - Biota - Wednesday. -M: UNITI, 2007.
8. The content of the discipline. Family relationships and personality characteristics. The world of the language being studied. Cultural features and national traditions of the USA and Great Britain. Modern education system.	

1. Basic information about the discipline:	
Name of the discipline	**Kazakh language**
2. The number of credits	**10**
3. Prerequisites:	Theoretical and practical skills corresponding to the basic levels A1, A2
4. Post requisites:	Professional Kazakh
5. Competencies:	- to choose and use language and speech tools correctly on the basis of a complete understanding of vocabulary, the grammatical system of knowledge and the pragmatic content of intentions; -transmit the exact content of the text, be able to formulate conclusions, characterize the final part of the entire text and its individual structural parts; -explain textual information, disclose style and genre features of social, social, cultural, socio-political, educational and professional texts; - be able to request and report information in accordance with communication situation, evaluate the actions of participants in verbal communication, use information to influence a friend or unfamiliar interlocutor; -in accordance with the peculiarities of linguistic and culturological communication, show personal, social and professional competencies; - discuss ethical, cultural and socially significant problems, be able to express their point of view, justify it, critically evaluate the opinions of participants; -realize 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 a meaningful point of view complete, in due lexical and grammatical and pragmatic level of one's position.
6. Course author	Department of Kazakh and Russian languages
7. Basic literature	1. Abduova BS, Asanova UO Kazakh language: Handbook for Russian-speaking groups. - Astana, 2017.-282b. 2.Aytbayeva BM Kazakh language (level B1) textbook. - Karaganda, 2014. - 205 p. 3. Bozbayeva-Hung AT, Balabekov AK, Dosmambetova GK, Salykova BO, Khazimova A.Zh. Kazakh language: medium-level textbook. National Testing Center. - Astana: 2017.
8. The content of the discipline Scientific and technical style and its features. Functional styles. General concept of scientific and technical style. Professional concepts and terms in a scientific text. The interactive form of scientific speech. Dialogue and its features. Features of oral and written scientific speech.	

1. Basic information about the discipline:	
Name of the discipline	**Russian language**
2. The number of credits	**10**
3. Prerequisites:	School course of the Russian language and literature
4. Post requisites:	Professional Russian
5. Competencies:	- make the right choice and use of linguistic and verbal means to solve certain tasks of communication and cognition on the basis of knowledge of a sufficient amount of vocabulary, a system of grammatical knowledge, pragmatic means of expressing intentions; 2. transmit the factual content of the texts, formulate their conceptual information, describe the

	derivative knowledge (pragmatic focus) of both the entire text and its individual structural elements; - interpret the information of the text, explain in the scope of certification requirements the style and genre specifics of the texts of the socio-cultural, socio-political, official-business and professional areas of communication; - build programs of speech behavior in situations of personal, social and professional communication in accordance with the norms of language, culture, the specifics of the sphere of communication, certification requirements; - discuss ethical, cultural, socially significant problems in discussions, express their point of view, defend it reasonably, critically evaluate the opinions of interlocutors; - to participate in communication in various situations in different areas of communication in order to realize their own intentions and needs (domestic, educational, social, cultural), declaring them ethically correct, meaningfully complete, lexico-grammatical and pragmatically appropriate to the situation; - compile everyday, socio-cultural, official-business texts in accordance with generally accepted standards, a functional orientation, using lexical-grammatical and pragmatic material of a certain certification level that is adequate to the set goal.
6. Course author	Department of Kazakh and Russian languages
7. Basic literature	1. Russian language: a textbook for students of Kazakh departments of universities (undergraduate) / ed. K.K. Akhmedyarova, K.K. Zharkynbekova. - Almaty: Kazakh University, 2008. 2. Mukhamadiev H.S. A guide to the scientific style of speech. Russian language. - Almaty: Cossack Universities, 2009. 3. Fedosyuk M.Yu., Ladyzhenskaya T.A., Mikhailova O.A., Nikolina N.A. Russian language for non-philological students: a textbook. - M., 2000 .-- 256 s.
8. The content of the discipline Fundamentals of reading, translation, writing, listening in Russian. Russian language in Kazakhstan. The main vocabulary of the scientific style. Types of service documents. Scientific and special technologies. Information and communication technology. Legal and legal documents.	

1. Basic information about the discipline:	
Name of the discipline	**The modern history of Kazakhstan**
2. The number of credits	**5**
3. Prerequisites:	School basic knowledge
4. Post requisites:	Cultural Studies, Political Science, Philosophy, Sociology
5. Competencies:	As a result of mastering the discipline, students must: - know the prerequisites for the formation of statehood in modern Kazakhstan at the source of world and Eurasian historical processes; - be able to critically analyze historical events, on the basis of retrospective, comparative. historical and other scientific methods to have the skills to compare them with the world development of mankind; - to master the skills of analyzing the activities of historical figures of modern Kazakhstan, complex historical processes and phenomena; - comprehensively take into account the priorities of a kind of Kazakhstani development, its features, etc.
6. Course author	Department of History of Kazakhstan
7. Basic literature	1. The modern history of Kazakhstan: a textbook for students of non-historical specials. (undergraduate) higher. textbook. institutions / B. G. Ayagan [and others] .; ed. B. G. Ayagan; Institute of History of the State University of Education and Science of the Republic of Kazakhstan. - Almaty: Rarity, 2010. 2.Aminov T.M. The modern history of Kazakhstan. Tutorial. -Almaty., 2017. 3.Nazarbayev N.A. Era of Independence.- Almaty: ҚАЗАқ-parat, 2017.

	4. Nurtazina R.A. National Security of the Republic of Kazakhstan: Textbook.- Almaty: Bastau, 2014. 5. Ertlesova J. Reforms of the 90s: interviews with key participants in the events. - Almaty, Atamyra. - 2016.
8. The content of the discipline History, specificity of historical processes and phenomena. Features and specifics of historical processes. The subject and methods of historical culture. Theoretical and methodological concepts.	

1. Basic information about the discipline:	
Name of the discipline	**Philosophy**
2. The number of credits	**5**
3. Prerequisites:	Sociology, Political Science, Cultural Studies, Psychology, Modern History of Kazakhstan.
4. Post requisites:	Green Economy and Climate Change
5. Competencies:	- describe the main content of ontology and metaphysics in the context of the historical development of philosophy; explain the specifics of philosophical understanding of reality; substantiate a worldview as a product - philosophical reflection and study of the natural and social world; - classify the methods of scientific and philosophical knowledge of the world; - interpret the content and specific features of the mythological, religious and scientific worldview; - substantiate the role and importance of key worldview concepts as values of the social and personal being of a person in the modern world; - analyze the philosophical aspect of media texts, socio-cultural and personal situations to justify and make ethical decisions; to formulate and competently argue their own moral position in relation to the urgent problems of modern global society; - conduct research relevant to identify the philosophical content of problems in the professional field and present the results for discussion.
6. Course author	Department of Philosophy
7. Basic literature	1. Petrova V.F., Khasanov M.Sh. "Philosophy". - Almaty: Evero, 2014. 2. Bertrand R. "History of Western Philosophy" - M.: Publisher Litres, 2018. - 1195 p. 3. Kenny A. "New History of Western Philosophy". Volume 1-4. - Oxford University Press, 2006–2010. (Kenny Hey. “New History of Western Philosophy.” Volum 1-4 - Oxford University Press, 2006-2010)
8. The content of the discipline Introduction to Philosophy: Philosophy, its subject and place in the culture of mankind; History of Philosophy: Ancient World Philosophy, Ancient Philosophy, Medieval Philosophy, Renaissance Philosophy, Modern Philosophy, Enlightenment Philosophy, Classic Stage of Modern Philosophy, German Classical Philosophy, Marxism, Frankfurt School Philosophy, Utopian Socialism, Russian Philosophy; Modern philosophy: philosophy of life, psychoanalytic philosophy, philosophy of existentialism, philosophy of positivism, structuralism, pragmatism; Philosophical problems of understanding the world: the doctrine of being (ontology), the doctrine of development (dialectics), the problems of consciousness, the philosophical problems of cognition (epistemology), the nature of man and the meaning of his existence; Philosophical problems of society: the doctrine of society (social philosophy), philosophical problems of culture, culture and civilization, the future of mankind (philosophical aspect), a person in the information-technological world.	

1. Basic information about the discipline:	
Name of the discipline	**Political science and sociology**
2. The number of credits	**4**
3. Prerequisites:	Basic school knowledge
4. Post requisites:	Philosophy, Economy of nature using

5. Competencies:	- identify objects of study of sociology (society, social organizations, social groups, the individual, etc.) to explain social reality; Explain key sociological ideas and theories; describe the social structure and stratification of society, distinguish and analyze the degree of social inequality; - disclose the mechanism for the formation of public opinion and consciousness in society; analyze the features of social institutions in the modernization of Kazakhstani society; - understand the mutual influence of social processes at the micro and macro levels, using the advantages of a sociological perspective; distinguish and justify sociological research strategies and methods for collecting and analyzing information; apply the sociological methodology to the study of contemporary problems of society. - describe the features of the organization and functioning of political institutions (institutions of representation and coordination of interests); demonstrate an understanding of the mechanisms and principles of the functioning of political power, political institutions, domestic, foreign, world politics and international relations; to demonstrate an understanding of the essence and patterns of the functioning and development of politics, its role in various areas of society; substantiate the relationship of political systems and political regimes; - assess the degree of objectivity of political information from various sources, reasonably express their civic position, evaluate facts, events, phenomena based on an analysis of the political strategy and national interests of modern states; justify the leading role of identity (national, civil) as a factor in ensuring the national security of the Republic of Kazakhstan; to identify the nature of socio-political conflicts and evaluate their legitimacy; generate new ideas and apply to changing political reality
6. Course author	Department of Philosophy
7. Basic literature	1. Nazarbayev N.A. A look into the future: the modernization of public consciousness.-Astana, 2017. 2. Biekenov K.U., Biekenova S.K., Kenzhakimova G.A. "Sociology: Textbook." - Almaty: Evero, 2016. - 584s. 3. Sociology. Fundamentals of General Theory: Textbook / Ed. G.V. Osipov, L.N. Moskvichev. - 2nd ed., Rev. and add. - M .: Norma, 2015 .-- 912 p. 4. Macionis J. Society: The Basics. Pearson, 2016. (Masionis Jay. Souceti: The Bizics. Parson, 2016.) 5. Heywood A. Politics. - N.-Y .: Palgrave Macmillan, 2013. (Hayood Hey. Politics. - En. - Wye: Palgrave Macmillan, 2013)
8. The content of the discipline The subject, methods and functions of political science. History of Western Political Thought. Politics as a public phenomenon. Political power. Political system. Political culture and political socialization. The state as a political institution. State and civil society. The main factors of world politics. Theory and methodology of sociological analysis. Types of social organization of society. Social structures and processes.	

1. Basic information about the discipline:	
Name of the discipline	**Cultural studies and psychology**
2. The number of credits	**4**
3. Prerequisites:	Basic school knowledge
4. Post requisites:	Philosophy
5. Competencies:	- describe the morphology and anatomy of culture as a system of parameters and forms in contexts: nature, man, society; - explain the origin and essence of signs, meanings, archetypes, symbols as a system of cultural code through correlation with the type of material culture defined by the way of being; - streamline information on the cultural heritage of the inhabitants of Kazakhstan and determine the channels of their influence on the formation of the culture of the Kazakh people; - classify the cultural capital of the Turks, streamline the forms and channels of cultural interaction with the peoples of

	Western Europe, the Middle East, identify their contribution to the intellectual and cultural history of mankind and the Kazakh people; - provide reasoned and justified information on the various stages of the development of Kazakh culture as a factor in preserving the cultural heritage and the Kazakh language, including modern state programs for its development and modernization; - give an objective assessment of the national cultural heritage from the position of maintaining the status of the Kazakh culture, the Kazakh language and their role in the formation of cultural and national identity; - assess the state of modern Kazakh culture, identify and justify the prospects for its development and the direction of modernization; - to build programs of professional activity taking into account cultural characteristics. Understanding the psychological foundations of personality and the creation of a tentative basis for students to study personality; Formed and developed the ability to effectively build interactions and communication with people, the ability to create a personal growth strategy, the ability to develop a path to successful professional activity. Be able to use the specifics of psychological knowledge in a specific activity; The skills of analysis of the psychological reasons underlying the decrease in the effectiveness of activities have been formed; Apply psychological knowledge in future practice; Know and understand the psychological foundations of occupational stress and ways to overcome it.
6. Course author	Department of Philosophy
7. Basic literature	1. Dzhakupov S.M. "Introduction to General Psychology." - A .: Kazakh University, 2014. 2. Rudenko A.M. "Psychology in diagrams and tables": a training manual. –M: Phoenix, 2016. –379 p. 3. Nurzhanov B.G., Erzhanova A.M. “Culturology.” - Almaty, 2011. 4. Zholdubaeva A.K. "Culturology: a workshop." - Almaty: Treasury named after al-Farabi, 2014.
8. The content of the discipline The development of the socio-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. Fundamentals of general psychology, personality psychology, individual typological personality traits: temperament, character, ability; Emotional-volitional sphere of personality, Cognitive processes: memory, attention, imagination, thinking and speech. Psychology of professional communication.	

1. Basic information about the discipline:	
Name of the discipline	**Information and communication technologies**
2. The number of credits	**5**
3. Prerequisites:	Maths, physics
4. Post requisites:	GIS technology in agriculture / Environmental mapping and GIS
5. Competencies:	As a result of studying the discipline, students should: Know: - The main trends in the field of information and communication technologies; - economic and political factors contributing to the development of information and communication technologies; - Features of various operating systems. - use information resources to search and store information Be able to: - work with spreadsheets, perform data consolidation, build graphs; - work with databases; - apply methods and means of information protection;

	- design and create websites; - perform processing of vector and raster images; - create multimedia presentations; - use various social platforms for communication. Own: - skills of applying modern information technologies in everyday life and in educational activities.
6. Course author	Department of Information and Communication Technologies
7. Basic 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. The content of the discipline Data analysis. Data management. Database systems. Networks and telecommunications. Cybersecurity. Internet technologies. Cloud and mobile technology. Multimedia technology. Smart technologies: IoT, BigData, Blockchain. Artificial Intelligence. Green technologies in ICT. Teleconferencing. E-technology. E-business. E-learning. E-government. Information technology and the professional field. Industrial ICT.	

1. Basic information about the discipline:	
Name of the discipline	**Physical education**
2. The number of credits	**8**
3. Prerequisites:	biology, anatomy, human physiology, hygiene, medical supervision, valeology, pedagogy, psychology
4. Post requisites:	The program of the course "Physical Culture" develops skills in the field of physical culture of students, forms the needs for maintaining a healthy lifestyle, maintaining and strengthening health, improves the level of physical fitness for the realization of their abilities in the process of everyday activities
5. Competencies:	- Possession of the methodological principles of physical education, methods and means of physical education. He independently applies them to increase the adaptive reserves of the body and promote health. - Possession of knowledge and skills of a healthy lifestyle, ways to maintain and promote health. - Able to follow socially significant ideas about a healthy lifestyle, adhere to a healthy lifestyle. - Possession of the basics of professionally-applied physical training, the basics of self-study techniques and can exercise self-control over the state of your body.
6. Course author	Shkurkov A.S., Satbaev E.K.
7. Basic literature	1. Ilyinich V.I. The physical education of the student. Moscow, 2001. 2. Ivanov G.D., Kulnazarov A.K. Physical education of students. Almaty, 2002. 3. Theory and methods of physical education. / Under the total. ed. A.P. Matveeva and D. Novikov. -M .: 2005.

8. The content of the discipline Theoretical training. Athletics. Football. Basketball. Ski training.

1. Basic information about the discipline:	
Name of the discipline	**Bases of economic theory and right**
2. The number of credits	**5**
3. Prerequisites:	Philosophy, History of Kazakhstan, mathematics
4. Post requisites:	Business law
5. Competencies:	- Know the laws of economic development and law; - know the basic concepts created during the long evolution of economic thought; - know the principles of the functioning of the market mechanism of self-regulation and state influence on the economy; - be able to systematize knowledge about the nature and forms of manifestation of economic and legal phenomena and processes; - be able to put into practice the methods of scientific knowledge of economic and legal phenomena and patterns; - have the skills to analyze the status and trends of socio-economic development of the national and world economy; - have the skills of an interdisciplinary approach in solving economic and legal problems; - have the skills necessary for the implementation of subjective rights and legal duties in various life situations.
6. Course author	Ovchinnikova T.V.
7. Basic literature	1. Balikov V.Z. General economic theory. Textbook. –M .: 2015. 2. Bazylev NI, Bazyleva MN Economic theory. Minsk, 2010. 3. Grodsky V.S. Economic theory: a textbook for undergraduate students. Third generation standard. -SPb .: Peter, 2013. 4. Dzhusibalieva A.K., Erzhanova A.A. Economic theory: textbook. - Astana: KATU named after S. Seifullina, 2016. 5. Sapargaliev G., Ibraeva A.S. Theory of Government and Rights. Textbook. -Almaty: Zhetyzhary, 2012. 6. Dulatpekov N.O., Amandykova S.K., Turlaev A.V. Fundamentals of the state of law of modern Kazakhstan. Almaty, 2012. 7. Atzhanov T.Zh., Rodnov A.M. Theory of state and law: schemes and comments.-SPb. Astana-North, 2013. 8. www.nsc.kz 9. www.zakon.kz 10. www.conlex.kz/nauk_publikacii/regdejtao.html
8. The content of the discipline. The subject of the foundation of economics and law. Fundamentals of social production and economic systems. Forms of social economy, the emergence of money. The mechanism of functioning of the market system: demand, supply, price and competition. Production, costs and income of the company, markets for factors of production. National economy: content, structure and measurement of results. Economic growth and market instability: inflation and unemployment. State regulation and economic security of the national economy. The main branches of Kazakhstan law. Constitutional law. Administrative law. Civil law. Family law. Labor law. Criminal law.	

1. Basic information about the discipline:	
Name of the discipline	**Professionally-oriented foreign language**
2. The number of credits	**3**
3. Prerequisites:	Foreign language
4. Post requisites:	Writing thesis
5. Competencies:	**As a result of studying the discipline, students should:** know:

	- categorically - conceptual apparatus of ecology in a foreign language, professional terminology in the directions of development of modern ecology; - the basics of vocabulary and grammar of a professionally-oriented foreign language in the specialty of ecology, the basic grammatical phenomena characteristic of oral and written professional speech; - The basics of business correspondence in the framework of international cooperation; - rules of speech etiquette when communicating in a professional environment. - methods for collecting, storing and processing environmental information; - educational and scientific literature, online resources on environmental issues in a professionally-oriented foreign language; be able to: - freely read and translate original literature on the chosen specialty with subsequent analysis, interpretation and assessment of the information extracted, for example: to generalize and analyze foreign literature and Internet sites about the state of the environment, the dynamics of environmental processes associated with anthropogenic impact and natural disasters; - to transmit in writing in a foreign language and correctly format information in accordance with the goals and objectives of the training (abstract, abstract, resume), to translate texts in the specialty in writing; - participate in professional discussions, round-table discussions, perceive and understand public speaking in direct and indirect communication (lectures, reports, television and Internet programs). - conduct educational and upbringing work in a foreign language environment in the field of ecology; have skills: - oral communication in the specialty in monologue and dialogue form, preparation of a scientific report, report, presentation, for example on environmental issues and sustainable development in a foreign language; - conducting business correspondence, correspondence in a professionally-oriented foreign language; - recording the results of field and experimental environmental studies for the subsequent writing of essays, essays and scientific articles in a foreign language.
6. Course author	Zhaglovskaya A.A.
7. Basic literature	1. Savel'ev L.A. Uchebnoe posobie anglijskogo jazyka "EnglishfortheStudentsofEcology" dlja jekologov. -SPb: izd. RGGMU, 2007 - 148 s. 2. Saspugayeva G.Y. Ecology. Textbook. S.Seifullin Kazakh agrotechnical university, 2015, -179 pages. 3. Ivanova N.K. Anglijskij jazyk dlja himikov (fonetika). -Ivanovo, "IGHTU", 2007, -100 s. (adres v Internete: http://main.isuct.ru/files/dept/ino/fonetika.pdf) 4. Kutepova M.M. - Theworldofchemistry / Anglijskij jazyk dlja himikov: Uchebnik: Izd. 4-e. -M.: KD Universitet, 2006. -256 s. 5. Serebrennikova Je.I., Krugljakova I.E. Anglijskij jazyk dlja himikov: Uchebnik: Izd. 3-e. -M.: Al'jans, 2009. -400 s. 6. Timofeeva T.V., Potaluj L.V. TechnicalCorrespondence: Uchebnoe posobie po anglijskomu jazyku. -Voronezh: Izd-vo VGU, 2005. -27 s. (adres v Internete: http://window.edu.ru/window catalog/files/r40141/may05070,pdf) 7. K. Harding. Englishfor Specific Purposes. Oxford University Press, 2009. 8. AkimovaT.A. Jekologija. Chelovek - Jekonomika - Biota - Sreda. -M: JuNITI, 2007.
8. The content of the discipline Categorical-conceptual apparatus of modern ecology in a professionally-oriented foreign language. Fundamentals of reading, translating, writing, listening and speaking a foreign language. Theoretical and applied problems of ecology. Ways to solve environmental management and sustainable development of the world. ThedefinitionofecologyasascienceEcologyindividuals - autecology. EcologicalfactorsandtheirclassificationThelawsin ecology Ecological factor Trophic structure of the ecological community. Ecosystem and biocenosis Population ecology. Characteristics of the population The biosphere and noosphere concept Natural Resources	

1. Basic information about the discipline:	
Name of the discipline	**General Ecology**
2. The number of credits	**7**
3. Prerequisites:	Biology
4. Post requisites:	Ecology of plants and animals, Ecological biogeography
5. Competencies:	As a result of studying the discipline, the student must: know: - environmental laws and principles of interaction of organisms with the environment; - types and composition of anthropogenic impact on the biosphere; - The essence of the current environmental crisis; - requirements for professional responsibility for the preservation of the habitat; - The principles of state policy in the field of environmental protection. be able to: - assess the state of ecosystems; - to predict the consequences of their professional activities in terms of impact on biosphere processes; - choose the principles of environmental protection in accordance with environmental laws. own: to analyze socially significant problems and processes taking place in society, to predict their possible development in the future.
6. Course author	A.T. Kuatbaev
7. Basic literature	1. Kuatbaev A.T. Volleys ecology: oқulyқ. - Almaty: Dəuir, 2012 .-- 376 b. 2. Brodsky A.K. Zhalyp ecologiyany ңysқasha courses. Oқu Urali. - Almaty: Gylym, 1997. 3. Kolumbaev S.Zh., Bildebaeva R.M. Volleys ecology. - Almaty: “Kazakh University”, 2006. 4. Mambetkaziev E., Sybanbekov Қ. Tabiғat Korғau. Oқu Urali. - Almaty: Kaynar, 1990. 5. Bigaliev A.B., Halilov M.F., Sharipova M.A. Fundamentals of general ecology. - Almaty: “Kazakh University”, 2007. 6. Zhamalbekov E.Y., Bildebaeva R.M. Zhalypy topyraқtanu zhne topyraқ geography men ecology. - Almaty: Kazakh University, 2000. 7. Akimova T.A., Haskin V.V. Ecology. Man-economy-biota-environment. -M.: UNITY, 2008. 8. Shilov I.A. Ecology. - M.: Higher School, 2001. 9. Ilyin V.I. Ecology, - M.: “Perspective”, 2007. 10. Novikov Yu.V. Ecology, environment and people. - M .: FAIR-PRESS, 2003.

8. The content of the discipline

The place of ecology in modern science and in the training of specialists. The concept of ecology: the historical interpretation of the term (E. Haeckel), a modern definition that emphasizes the interdisciplinary nature of science. The history of ecology: the main stages, their characteristics, personalities. The subject and tasks of ecology. Objects of study of modern ecology, the relationship with the structure of science. Research methods of modern ecology. The main methodological approaches used in environmental research: ecosystem, population, evolutionary, historical. Levels of organization of living matter, studied in ecology. Periodization of change of concepts in the development of science. Modern ecology concept. Distinctive features of ecology at the present stage. Basic concepts and terms. The laws of B. Comonner. Types of global problems on the globe. Demographic and food problems. Environmental problems and their aspects. Shortage of fresh water and desertification, causes, consequences. Global warming, causes, consequences. UN Convention on Climate Change. Problems of the ozone layer, causes, consequences. Greenhouse effect, causes, consequences. Acid rain, photochemical smog. Problems of the oceans. Decrease in forest plantations, causes, consequences. Problems of biodiversity conservation.

1. Basic information about the discipline:	
Name of the discipline	**Practice of General Ecology**
2. The number of credits	**2**
3. Prerequisites:	General ecology
4. Post requisites:	Ecology of plants and animals, Ecological biogeography
5. Competencies:	As a result of mastering the discipline, the student must: know: the basic laws of ecology; concepts and categories of ecology; research methods used in ecology basic theoretical concepts of autecology, demecology and synecology. be able to: characterize the ecological conditions of the habitat, describe the structure of the population and community, evaluate the productivity of ecosystems, analyze the characteristics of the natural and anthropogenic dynamics of populations and ecosystems. own: skills in the search and analysis of environmental information; skills to apply environmental knowledge to solve professional problems; theoretical ideas about the relationship of ecology with other sciences.
6. Course author	Kuatbaev A.T.
7. Basic literature	1. Kuatbaev AT General Ecology: Textbook. - Almaty: April, 2012 - 376 p. 2. Brodsky A.K. Zhalyp ecologiyany ңуsқasha courses. Oқu Urali. - Almaty: Gylym, 1997. 3. Kolumbaev S.Zh., Bildebaeva R.M. Volleys ecology. - Almaty: “Kazakh University”, 2006. 4. Mambetkaziev E., Sybanbekov Қ. Tabiғat Korғau. Oқu Urali. - Almaty: Kaynar, 1990. 5. Bigaliev A.B., Halilov M.F., Sharipova M.A. Fundamentals of general ecology. - Almaty: “Kazakh University”, 2007. 6. Zhamalbekov E.Y., Bildebaeva R.M. Zhalypy topyraқtanu zhne topyraқ geography men ecology. - Almaty: Kazakh University, 2000. 7. Davidenko T.N., Nevsky S.A., Torgashkova O.N. and other Botanical and Environmental Workshop: methods for collecting and analyzing data: a training manual. - Saratov: Nauka, 2011 .-- 67 p. 8. Denisova S.I. Field practice in ecology: Textbook. - Minsk: Universitetsae, 1999 .-- 120 s. 9. Fedorova A.I., Nikolskaya A.N. Workshop on Ecology and Environmental Protection: A textbook for students of higher educational institutions. - M .: VLADOS, 2001 .-- 288 p. 10. Elenevsky A.G., Solovieva M.P., Tikhomirov V.N. Botany. Systematics of higher or terrestrial plants: a textbook for high schools. -4th, rev. -M.: Academy, 2006. -464 p.

8. The content of the discipline

- get an idea of the soils, flora and fauna and its components,
- get acquainted with the lists of plants and animals of the native (natural, original, local) flora and fauna, as well as adventitious, or alien flora and fauna,
- learn to work with plant identifiers and compose herbaria,
- familiarization with various types of aquatic and terrestrial ecosystems, their species composition, ecological groups and factors acting in ecosystems;
- knowledge of the basic principles of organization and methods of conducting independent field observations; analysis of observational data;
- development of ecological trail routes along one of the ecosystems;
- fulfillment of an individual task, providing for the collection, processing and systematization of scientific and special information on the topic and the implementation of a practical task;
- the formation of skills in the design of educational and research reporting materials based on the results of the practice (practice diary, field diary, report on the results of the practice, materials for performing an individual task);
- the formation of an ecological worldview based on an understanding of the mechanisms of the influence of anthropogenic factors on the environment.

1. Basic information about the discipline:	
Name of the discipline	**Agrometeorology**
2. The number of credits	4
3. Prerequisites:	For the successful development of the discipline, knowledge of physics, mathematics and geography is required in the scope of the secondary school curriculum.
4. Post requisites:	Special disciplines. Writing term papers and thesis.
5. Competencies:	Have an understanding, knowledge and professional skills about meteorological factors and physical processes occurring in the atmosphere that affect agricultural production; - Know the types of meteorological observations, meteorological instruments. Be able to conduct meteorological observations using meteorological instruments; - Master the methods of agroclimatic and agrometeorological characteristics and assess the conditions of the growing season; -Able to take into account weather conditions and weather forecasts to adjust the elements of the production process in agriculture. Own methods for predicting adverse meteorological phenomena; -Know the methods of efficient use of climate and microclimate resources when performing agricultural work in agriculture.
6. Course author	I.I.Zhumagulov
7. Basic literature	1. Losev A.P., Zhurina L.L. Agrometeorology. -M .: Kolos, 2001 .-- 297 p. 2. Agroecology. Textbook for university students on agronomic specialties / Ed. prof. V.A. Chernikova and Cand. geo sciences A.I. Checkeres. -M .: Kolos, 2000 .-- 535 p. 3. Agroecology. Methodology, technology, economics. T. 2. Textbook for university students on agronomic specialties / Ed. prof. V.A. Chernikov and associate professor A.I. Checkeres. -M .: Kolos, 2004.399 p. 4. Milashchenko N.Z., Sokolov O.A., Bryson T., Chernikov V.A. Sustainable development of agrolandscapes. T. 2. Pushchino, 2000. –598 p. 5. Explanatory Dictionary of Agricultural Meteorology / Ed. I.G. Gringoff and A.M. Shamena. -SPb .: Gidrometeoizdat, 2002. -471 p. 6. Kashkin VB, Sukhonin A.I. Remote sensing of the Earth from space. Digital image processing. Uch. allowance. -M .: Logos, 2001.264 p.

8. The content of the discipline.

1. The importance of climate for agricultural production. Subject and research methods in meteorology. Atmosphere pressure. The composition and structure of the atmosphere. Instruments for measuring atmospheric pressure.
2. Solar radiation. The spectral composition of solar radiation. Direct and diffuse radiation, total radiation. Photosynthetic active radiation and its efficiency. Devices for measuring solar radiation.
3. The temperature regime of soil and air. Thermal properties of the soil. Soil temperature measurement. Air temperature measurement. Instruments for measuring temperature.
4. Humidity. The content of water vapor in the air, depending on its temperature. Methods and instruments for measuring air humidity.
5. Atmospheric precipitation, Types and types of precipitation. The value of precipitation for agriculture. Instruments for measuring the amount and intensity of precipitation. Snow cover, measuring the height and density of snow cover.
6. Soil moisture and its importance for plants. Methods for determining soil moisture and productive moisture reserves in it. The value of spring reserves of productive moisture and their assessment. Agrohydrological soil constants. Methods of regulation of the water regime of soils in the zone of Northern Kazakhstan.
7. Wind, causes of its occurrence and characteristics. Instruments for measuring wind speed and direction. Rose of Wind. Agricultural work, during which it is necessary to take into account the speed and direction of the wind. The importance of wind in agriculture.
8. Adverse weather events and their importance for agriculture. Droughts and dry winds, meteorological criteria. Dust storms and wind erosion of soils. Hail, rain. Frost
9. Air masses. Types of air circulation. Latitudinal (zonal) and meridional circulation. Atmospheric fronts. Weather in cyclone and anticyclone. Weather forecast. Synoptic map. Local

weather signs.
10. Meteorological observations. Types of meteorological observations and their methods. Carrying out meteorological observations with modern methods of processing and preservation. The use of weather stations in agriculture.
11. Agrometeorological forecasts. The forecast of productive moisture reserves. Weather forecast. Modern methods of meteorological forecasts. Types and forms of agrometeorological information and their use.

1. Basic information about the discipline:	
Name of the discipline	**Technology of crop production**
2. The number of credits	5
3. Prerequisites:	Biology school course, general ecology
4. Post requisites:	Methods of processing and recycling agricultural waste
5. Competencies:	know: the main trends and directions of crop development; theoretical foundations of obtaining high and environmentally friendly crops, national economic importance, classification and systematics of field crops, their morphological and biological characteristics, requirements for growing conditions; ways to improve the quality of crop production and requirements for its indicators; modern energy and resource saving technologies for cultivating field crops; the organization of production processes in the cultivation of field crops; methods of harvesting and methods for reducing losses during its implementation, methods for post-harvest refinement of the crop, storage and processing of products; be able to: develop and put into practice modern technologies for cultivating field crops, taking into account soil and climatic conditions and material and technical equipment of farms; put into practice methods of programming and crop management; carry out biological and agronomic control over crop formation; determine the sowing quality of seeds and prepare them for sowing; determine and analyze the crop structure of various agricultural plants; carry out economic and energy assessment of field crop production; have skills: knowledge of methodological approaches to the development of modern technologies for cultivating field crops.
6. Course author	N.A.Shestakova, B.O.Amantaev, A.A.Kipshakbaeva, B.K.Arinov
7. Basic literature	1. Arinov K.K., Shestakova N.A. Crop production of Northern Kazakhstan. Astana, 2009. 2. Arinov K.K., Musynov K.M., Shestakova N.A., Serekpaev N.A., Apushev A.K. Crop production.-Astana, "Tome". 2016. 3.Arinov K.K., Mozhaev N.I., Shestakova N.A., Iskakov M.A., Serekpaev N.A. Workshop on crop production. –Astana. Kazakh S.Seifullin Agrotechnical University, 2014.332 p.

8. The content of the discipline.
Crop 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 the distribution of the main field crops in the Republic of Kazakhstan. Seed material is one of the main means of production in crop production. Cereal crops. The importance of spring and winter bread in increasing grain production. Morphological structure, biological features, cultivation and harvesting technology. The main areas of grain production. Cereal legumes 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 characteristics and growing technology. Importance and use of oilseeds and essential oil crops in agriculture. Morphobiological features and growing technology. Spinning crops, their diversity and use. Features of biology and cultivation technology. Tobacco and shag. Features of cultivation techniques.

1. Basic information about the discipline:	
Name of the discipline	**Ecology of plants, animals and microorganisms**
2. The number of credits	7
3. Prerequisites:	General ecology
4. Post requisites:	Ecological biogeography
5. Competencies:	The student must know: - the place and role of the ecology of plants, animals and microorganisms, as a science;

	- resistance to exposure to plants, animals and microorganisms to the effects of adverse factors; - temperature, light, air, water, soil, biotic and anthropogenic factors as an environmental factor affecting plants, animals and microorganisms; - Features and patterns of distribution of plants, animals and microorganisms; - the use and diversity of resources of the plant, animal world and microorganisms. be able to: - understand the mechanisms of the influence of environmental factors on plants, animals and microorganisms; - understand the processes of interaction of organisms with each other; - determine the necessary resources and conditions for the comfortable functioning of living organisms; - collect, process and interpret using modern technologies the data necessary for understanding the discipline being studied. own: - methods of searching for information in the field of ecology of plants, animals and microorganisms; - skills of a meaningful discussion of the problems that are reflected in this discipline; - the skills of students to form ideas about the processes of interaction of organisms with each other and with the environment; - skills of using theoretical and practical knowledge on the ecology of plants, animals and microorganisms in professional activities.
6. Course author	A.T. Kuatbaev
7. Basic literature	1. Ametov A.A. Botany. -Almaty: Dəuir, 2014. -512 p. 2. Mukhitdinov N.M., Begenov A.B., Aidosova S.S. Morphology and anatomy of plants. Textbook, - Almaty, 2001.280 s. 3. Lotova L.I. Morphology and anatomy of higher plants. -M .: 2000. -528 s. 4. Green N., Stout W., Taylor D. Biology: In 3 vols. -M .: 1990. Vol. 1. -368 p .; T.2. -325 s .; T. 3. -376 p. 5. Berezina N.A., Afanasyeva T.A. Plant Ecology: A Training Manual. - M .: IC "Academy", 2008. - 368 p. 6. Naumov N.P. Ecology of animals. Textbook. -M .: 1963. -619 p. 7. Dautbaeva K.A., Eszhanov B.E., Sapargalieva N.S., Nurtazin S.T. A variety of animals: a textbook. -Almaty: Dəuir, 2011 .-- 712 p. 8. Olzhabekova K.B., Eszhanov B.E. Zoology of vertebrates. - Almaty: Қазақ un-ti. - 2007. 1, 2 chats. - 398 p. 9. Eszhanov B.E., Kobegenova S.S., Nurtazin S.T. Ornithology: a textbook. - Almaty: Dəuir, 2011 .-- 272 p. 10. The course of zoology / Ed. Matveeva B.S. - M .: Higher school. 1966, v. 2. 11. Shigaeva M.Kh. Ecology of microorganisms. Tutorial. - Almaty: Kazakh University, 2002. - 171 p.
8. The content of the discipline The history of the study of ecologists of plants, animals and microorganisms. The main methods for studying the ecology of plants, animals and microorganisms. Ecological classifications of organisms. Life form of plants, animals and microorganisms. General issues of the sustainability of organisms. Some laws of environmental factors. The body's defensive reaction against stressors. Light as an environmental factor. Lighting mode. Quantitative and qualitative characteristics of lighting accepted by organisms. Ecological groups of plants in relation to light. Anatomical and morphological characteristics of plants in relation to light. The influence of light on the structure, growth, development, photosynthesis, transpiration of plants. Ecological groups of animals in relation to light. Photoperiodism and its environmental significance. Heat as an environmental factor. The temperature regime of the habitat. The effect of temperature on the vital functions (growth, development, photosynthesis, respiration, transpiration) of plants. Ecological plant groups according to Ellenberg. The effect of temperature on the livelihoods of animals. Ecological groups of animals in relation to temperature. Poikilothermic and homeothermic organisms. Adaptation of plants, animals and microorganisms to extreme temperatures. The rules of K. Bergman and D. Allen. Water as an environmental factor. The main properties of the aquatic environment. Morphological, anatomical and physiological adaptation of plants to water deficiency. Ecological groups of plants in relation to humidity. The environmental significance of transpiration. Factors affecting transpiration. Ecological groups, adaptive features of aquatic organisms. Air as an environmental factor. Environmental values of oxygen and carbon dioxide. The effect of pollution on plants. Assessment of	

pollution by vegetation. Anemophilia, anemochoria, draining by the wind, mechanical injuries. Methods of movement of animals in the air and in the soil. Soil as an environmental factor. The main properties and ecological significance of the soil. Ecological groups of plants in relation to soil pH. Salinization of the soil. Psammophytes and lithophytes. Methods of movement of soil organisms. The spread of microorganisms. The importance of microorganisms in ecosystems. Biological rhythms of organisms. Inner and outer loops. Daily, seasonal rhythms and rhythms of ebb and flow. Biotic environmental factors. The relationship of organisms in the biocenosis. Ecological niche. Gause principle. Ecological succession. Anthropogenic environmental factors. Anthropogenic habitat change. Features of agrocenoses and ruderal communities.	
1. Basic information about the discipline:	
Name of the discipline	**Training practice in animal and plant ecology**
2. The number of credits	**3**
3. Prerequisites:	General Ecology
4. Post requisites:	Ecological biogeography
5. Competencies:	As a result of training, the student must: know: - habitat types and different biotopes of organisms; - ecological groups of plants and animals with respect to light, humidity, temperature, etc .; - Features of species living in agro and natural cenoses; - modern experimental methods of working with biological objects in the field and laboratory conditions, be able to: - distinguish between ecological groups of plants and animals in relation to different types of abiotic environmental factors; - determine the lower and higher vascular plants, invertebrate and vertebrate animals of the area; - apply modern experimental methods of working with biological objects in the field and laboratory conditions, own: - methods of counting amphibians, reptiles, birds and mammalian species of the territory; - methods for studying the species diversity of artificial and natural ecosystems.
6. Course author	A.T. Kuatbaev
7. Basic literature	1. Ainagulova G.S., Nurmukhambetova G.S., Parshina G.N. Field practice in Botany. Guideline. Astana, 2013. 2. Parshina G.N., Ainagulova G.S., Nurmukhambetova G.S. Field practice in botany. Tutorial. - Astana: Master Poe, 2013. 3. Gordeeva T.N. et al. Practical course on plant taxonomy. -M .: 1986. -224 p. 4. Ametov A.A. Botany. -Almaty: Dəuir, 2014. -512 p. 5. Mukhitdinov N.M., Begenov A.B., Aidosova S.S. Morphology and anatomy of plants. Textbook, Almaty, 2001.280 p. 6. Olzhabekova K.B., Yeszhanov B.E. Zoology of vertebrates. - Almaty: Қазақ un-ti. 2007.1, 2 parts. - 398 p. 7. Davidenko T.N., Nevsky S.A., Torgashkova O.N. and other Botanical and Environmental Workshop: methods for collecting and analyzing data: a training manual. - Saratov: Nauka, 2011 .-- 67 p. 8. Denisova S.I. Field practice in ecology: Textbook. - Minsk: Universitetsae, 1999 .-- 120 p. 9. Fedorova A.I., Nikolskaya A.N. Workshop on Ecology and Environmental Protection: A textbook for students of higher educational institutions. - M .: VLADOS, 2001 .-- 288 p. 10. Elenevsky A.G., Solovieva M.P., Tikhomirov V.N. Botany. Systematics of higher or terrestrial plants: a textbook for high schools. - 4th, rev. - M.: Academy, 2006 .-- 464 p.
8. The content of the discipline Depending on the place and time of practical training: - development of professional competence of students through the study of basic and additional educational and scientific-methodical literature on topics of practice and the application of theoretical knowledge in the field;	

- the development of students' practical skills in field research;
- study and practical use of safety equipment in the field;
- familiarization with various types of aquatic and terrestrial ecosystems, their species composition, ecological groups and factors acting in ecosystems;
- knowledge of the basic principles of organization and methods of conducting independent field observations, analysis of observation data.
- development of ecological trail routes along one of the proposed ecosystems;
- fulfillment of an individual task, providing for the collection, processing and systematization of scientific and special information on the topic and the implementation of a practical task;
- the formation of skills in the design of educational and research reporting materials based on the results of the practice (practice diary, report on the results of the practice, materials for performing an individual task).
- the formation of an ecological worldview based on an understanding of the mechanisms of the influence of anthropogenic factors on the Earth's spheres.

1. Basic information about the discipline:	
Name of the discipline	**Integrated Plant Protection**
2. The number of credits	5
3. Prerequisites:	Biology, Chemistry, Soil Science, General Ecology, General Chemistry
4. Post requisites:	Organic farming, Climate Change and Green Economy
5. Competencies:	Knowledge and understanding (Descriptor A): demonstrate basic ideas about the bioecological characteristics of the main plant pests, their systematic position; features of the life cycle and reproduction of phytophages; morphological and biological features of phytopathogens; the main types of manifestations of diseases, the most dangerous types of diseases, agricultural crops; preventive and extermination measures to combat pests; To be able (Descriptor B): to determine the species composition of pests and diseases of agricultural crops; identify signs of damage and damage to plants, conduct diagnostics and registration of pests and diseases of agricultural crops, decide on the need for protective measures; Own (Descriptor C, D, E): to analyze knowledge of the state and possible development of the situation in agrophytocenoses of harmful organisms of plants, to draw a conclusion about the need for protective measures, to draw up a comprehensive system of measures for plant protection; To acquire practical skills (Descriptor C, D, E): compliance with safety measures when using plant protection products; use in practice of methods for identifying pests and pathogens of plant diseases, their diagnosis, proper selection and application of a set of plant protection measures, work with scientific, technical, regulatory and other documentation in the field of plant protection.
6. Course author	K.S. Baybusenov
7. Basic literature	1. Plant protection from disease. / Ed. Shkalikova V.A. - M .: 2004. 2. Protection of plants from pests. / Ed. Isaicheva V.I., 2003. 3. Sadykov B.S., Turganbaev T.A. Phytosanitary technologies for crop cultivation / Textbook. - Astana: KATU named after S. Seifullina, 2015 .-- 260 p. 4. Chulkina V.A. Integrated Plant Protection: Phytosanitary Systems and Technologies / Textbook. - M .: Kolos, 2009 .-- 670 p. 5. Reference agronomist for plant protection / Ed. Sagitova A.O., Ismukhambetova Zh.D. - Almaty, 2004. 6. Tuleyeva A.K. Protection of crops from pests / Guide to laboratory and practical exercises. - Astana, 2006. 7. Gorbulya V.S. Protection of crops from diseases / Guide to laboratory and practical exercises. - Astana, 2006. 8. Gruzdev GS, Zinchenko VA, and others. Chemical protection of plants. - M.: Agropromizdat, 1987 .-- 414 p. 9. The law on plant protection // Kazakhstanskaya Pravda, July 9-11, 2002.

8. The content of the discipline:
The content of the discipline includes the general goals and objectives of the study of the discipline, the chemical method in an integrated plant protection system; fundamentals of agronomic toxicology, physico-chemical fundamentals of the use of pesticides; Chemical plant protection products from pests, diseases and weeds, biological method of plant protection; physico-mechanical and genetic methods of plant protection; agrotechnical method and phytosanitary monitoring of the development and spread of pests; plant quarantine.

1. Basic information about the discipline:	
Name of the discipline	**Organic farming**
2. The number of credits	5
3. Prerequisites:	General ecology, General chemistry
4. Post requisites:	Climate Change and Green Economy, Economy of nature using, Subject disciplines
5. Competencies:	have an idea of Organic farming, food security of the country. Law and regulations on organic products in Kazakhstan. know: - the principles of Organic farming, the principles of the existence of ecosystems and farming. - the role of Organic farmingin providing consumers with environmentally friendly products; - master the methods of production of organic products in crop and livestock; - own methods of growing organic products without the use of pesticides.
6. Course author	I.I. Zhumagulov
7. Basic literature	1. "Production of organic products" Law of the Republic of Kazakhstan No. 423-V of November 27, 2015 (2018.24.05. As amended). 2. Poznyak S.S., Romanovsky Ch.A. Ecological farming. -Minsk. 2009. 3. Kant Gunther. Biological plant growing: the possibilities of biological agricultural systems. -M .: Agropromizdat. 1988, -205 p. 4. Prizhukov FB Alternative farming. Concept. // w. "Information materials". VNIITEI. 1991. –P. 21. 5. Zamotailov A.S. History and methodology of biological plant protection. Electronic course of lectures. - Krasnodar, 2012 .-- 237 p. 6. Sternschis M.V. Biological plant protection. Textbook. - M.: Kolos, 2004.224 p.
8. The content of the discipline The relevance of the efficiency of Organic farmingproduction and the rationale for the mechanism of transformation of agricultural producers into organic farming methods in Kazakhstan. Definitions and concepts of “Organic farming” and “organic production”, consideration and generalization of foreign experience in the production of Organic farmingproducts. The principles of Organic farming, the principles of the existence of ecosystems and farming. Technology for the production of organic products. Certification of organic products. Processing, storage, transportation, labeling of organic products. Methods of state regulation and support for agricultural producers of organic products in accordance with the rules of the WTO.	

1. Basic information about the discipline:	
Name of the discipline	**Agrochemistry and soil science**
2. The number of credits	5
3. Prerequisites:	Chemistry, Physics, General Chemistry, General Ecology
4. Post requisites:	Organic farming, Climate Change and Green Economy
5. Competencies:	After completing the discipline, the student must: To know and understand (Descriptor A): the formation, composition, properties and regimes of soils of the Republic of Kazakhstan; techniques for increasing soil fertility; classification and ecology of the main soil types of the Republic of Kazakhstan; soil research methods and ways of rational use of soil types;

	To be able (Descriptor B): use soil maps and cartograms in agricultural production; apply soil research methods; determine the degree of compliance of soil conditions with the requirements of crops; Own (C): methods of accounting and valuation of soils; land cadastral work and economic valuation of land; compilation of soil maps and cartograms for business entities; to draw up and put into practice a system of agrotechnical and special measures to increase soil fertility and crop yields. Have communication skills (D) discuss the state of the soil cover and ways to increase soil fertility; classification and ecology of the main soil types. To acquire practical skills (Descriptor E) to independently develop systems of agrotechnical and special measures to increase soil fertility.
6. Course author	Department of Soil Science and Agrochemistry
7. Basic literature	1. Tazabekov T. General soil science. - Almaty, 1998. 2. Tazabekov T. Soil geography. - Almaty, 2000. 3. Amralin A.U. Species and morphology of soils of Northern Kazakhstan. - Astana, 2002. 4. Kaurichev I.S. and other soil science. - M .: Agropromizdat, 1989. 5. Kovrigo V.P. and other soil science with the basics of geology. - M .: Kolos, 2000. 6. Zhamalbekov E., Bildebaeva R. Soil science and ecology and geography of soils. - Almaty, 2004. 7. Workshop on soil science. - M .: Kolos, 1986. 8. Taizhanov Sh. T., Amralin A.U., Koshkarov N.B. Soil science and the basics of geology. - Astana, 2008. 9. Latyshev N.N. Morphological features and basic soil properties. benefits - Astana, 2002. 10. Taizhanov Sh. T et al. Soil science and the basics of geology. Electronic textbook. - Astana, 2009
8. The content of the discipline Soil science as a science. The main stages of development. Communication with other sciences. The general scheme of the soil-forming process. Mineralogical and mechanical composition of the soil. Organic matter of the soil. Soil formation factors. The chemical composition of the soil. Soil colloids and soil absorption. Morphological features of soils. Soil structure. Physical and physico-mechanical properties of the soil, water, thermal and air conditions of the soil. Soil fertility, soil appraisal. Soils of Kazakhstan	

1. Basic information about the discipline:	
Name of the discipline	**Climate change and green economy**
2. The number of credits	4
3. Prerequisites:	General Ecology
4. Post requisites:	Organic farming, Economy of nature using
5. Competencies:	- Have the opportunity to understand the components involved in the research process in the field of climate change and the green economy. Describe and recognize the main types of research in the field of climate change and the green economy in Kazakhstan. Critically analyze key theoretical, methodological and ethical issues in a study on climate change and the green economy. Use and explain the main quantitative and qualitative methods of data collection and analysis. Plan, design and carry out small research projects on topics of interest in the field of climate change and the green economy. - Know the key concepts of climate, climate features, its changes as a result of economic activity, the impact of climate on natural and economic systems; the interconnection of the green economy and sustainable development on a global and national scale, the role of the green economy in the fight against climate change; adaptation to climate change in the world and the Republic of Kazakhstan; characteristics of greenhouse gases, their role in climate change, mechanisms for reducing GHG emissions, their implementation in Kazakhstan, GHG regulation system; the basics of energy conservation and energy efficiency; concepts of renewable energy sources, their types, practice in the field of international use,

	renewable energy potential in Kazakhstan; the impact of climate change on agriculture, the vulnerability of agriculture in Kazakhstan from climate change; consequences of climate impact on water resources, problems prevailing in the water sector of Kazakhstan, adaptation measures in the water sector; ways to solve the problem of waste offered by the green economy. - Be able to identify and analyze causal relationships of climate change and the environment; evaluate the role of climate resources in solving environmental, economic and social problems; use for solving research and practical problems related to the interaction of man and nature, the methods and tools of the "green" economy; draw up programs and plans for energy conservation in various sectors of the economy of Kazakhstan; analyze the best foreign practices in introducing new technologies, for example RES and make recommendations on their use in Kazakhstan; draw up programs for adaptation to climate change in the most vulnerable sectors of the economy of Kazakhstan; argued to defend their point of view in discussions on climate change and the green economy. - Have the skills to assess and analyze the state of the environment in connection with climate change, taking into account the requirements of the green economy; skills to develop national and regional programs and action plans for the implementation of green economy tools; ability to determine priority measures of the sustainable development policy of the Republic of Kazakhstan.
6. Course author	A.Sh. Utarbaeva, G.K. Satybaldieva
7. Basic literature	1. Alinov M.Sh. Fundamentals of the green economy: textbook. - Almaty: Bastau, 2016 .-- 340 p. 2. The concept of the transition of the Republic of Kazakhstan to the "green economy", approved by Decree of the President of the Republic of Kazakhstan dated May 30, 2013 No. 577. 3. The action plan for the implementation of the Concept on the transition of the Republic of Kazakhstan to the "green economy" for 2013-2020, approved by the Government of the Republic of Kazakhstan dated July 31, 2013 No. 750. 4. Fyuks R. Green revolution: Economic growth without prejudice to the environment / trans. E. Shukshina - M.: Alpina non-fixin, 2016 .-- 330 p. 5. National report on the state of the environment in the Republic of Kazakhstan. Republican State Enterprise "Information and Analytical Center for Environmental Protection" of the Ministry of Energy of the Republic of Kazakhstan. - Astana, 2015. 6. II-VI National Communication of the Republic of Kazakhstan to the UN Framework Convention on Climate Change. 7. Proceedings of the Sixth Ministerial Conference on Environment and Development in the Asia-Pacific Region MCED-6. 8. Towards a green economy in Europe: EU environmental policy targets and objectives 2010-2050. 9. The Law of the Republic of Kazakhstan dated September 7, 2011 "On energy conservation and energy efficiency." 10. Kyoto Protocol to the UNFCCC. 11. ISO 50001 - Energy management. 12. Association of Climate Change Officers training curriculum Renewables 2015 Global Status Report (GSR) - REN21. 13. The Law of the Republic of Kazakhstan dated July 4, 2009 No. 165-IV “On Supporting the Use of Renewable Energy Sources”.
8. The content of the discipline Climate change and the green economy. The concept of climate and its changes, the effects of climate change. Issues of sustainable development, the main provisions of the concept for the transition of the Republic of Kazakhstan to a green economy. International agreements to combat climate change, Kazakhstan's obligations under international agreements in the field of climate change. Renewable energy sources. Status and prospects of using renewable energy sources in Kazakhstan. Problems in the agricultural, water and other sectors of the economy that have developed in connection with climate change in Kazakhstan. Efficient waste management. Permissible discharges for water bodies.	

1. Basic information about the discipline:	
Name of the discipline	**Environmental monitoring**
2. The number of credits	5
3. Prerequisites:	General Chemistry, General Ecology
4. Post requisites:	Ecological, hygienic rationing and expertise in agriculture, Environmental laws and documentation in agriculture
5. Competencies:	To study the basic methods of observation, assessment and forecasting of environmental monitoring systems to prevent the impact of environmental factors of the agricultural sector on the state of the environment for rational nature management; Own methods of analyzing environmental processes, setting specific tasks and priorities for protecting the environment and society, knowledge on the laws of development of the biosphere and the conditions of anthropogenic and technological impact on nature; To be able to analyze the processes occurring in the components of the biosphere and to use methods for the detection and quantification of the main pollutants in the environment; to develop environmental measures. To master modern information methods of environmental monitoring and control of pollution of natural and environmental using GIS technologies; To be able to practically apply knowledge on agroecological monitoring to assess the quality of the natural environment in order to predict changes in environmental resistance to anthropogenic and technogenic effects.
6. Course author	A.A. Ismailova, N.A. Nurbaeva
7. Basic literature	1. Ismailova A.A., Nurbaeva N.A., Mukiyanova U.S. Environmental Monitoring: A Textbook. - Astana, KATU named after S.Seifullina. - 2018. –178 p. 2. Kuzenkov G.V. Introduction to Environmental Monitoring: A Textbook for High Schools. - N. Novgorod: NFURAO, 2002 .-- 72 p. 3. Ryspekov TR Environmental monitoring. - Almaty: Cossack University, 2003 .-- 156 p. 4. Chernykh N.F. Ecological monitoring of toxicants in the biosphere. - M .: 2003. - 430 p. 5. Ashikhmina T.A. Environmental monitoring: Textbook. method. allowance. -M .: AHAR, 2006 .-- 412 p. 6. Meysurova A.F., Dementiev S.M. Environmental monitoring. -H. 2. Physico-chemical methods for assessing water quality. - Tver, 2006. - 30 p. 7. Motuzova G.V., Bezuglova O.S. Ecological monitoring of soils. - M .: 2007. - 237 p. 8. Ashikhmina T.A. Environmental monitoring. –M .: 2008. - 416 p. 9. Prozhorina T.I., Kaverin N.V., Nikolskaya A.N. Ecological and analytical methods of environmental research: a training manual. - Voronezh: Publishing house "Sources", 2010. - 164 p. 10. Golitsyn A.N. Industrial ecology and environmental pollution monitoring. - M.: 2010 .-- 336 s. 11. Tetelman V.V., Yazev V.A. Basics of environmental monitoring: Textbook. - M.: Intellect, 2013 .-- 256 p. 12. Aidarkhanova G.A., Saspugaev G.E., Akshabakov Zh.E. Environmental monitoring: a workshop for students of specialty 5B060800-Ecology. - Astana, KATU named after S.Seifullina. - 2015 .-- 115 p.
8. The content of the discipline The nature and specificity of the methods of analysis, assessment and prediction of environmental pollution. Types of environmental monitoring (geoecological, biological, geosystem, engineering-geological, etc.). Features of the organization of monitoring of different hierarchical levels. Methodology for organizing the collection of environmental information for a comprehensive assessment of environmental pollution. Determination of the degree of anthropogenic and technogenic impact on the environment. Determining the quality of the natural environment at the local, regional and global levels. Interpretation of information data using modern information systems for predicting environmental pollution for the purpose of rational nature management and environmental safety.	

1. Basic information about the discipline:	
Name of the discipline	**Protection of atmospheric air**
2. The number of credits	5
3. Prerequisites:	Environmental chemistry
4. Post requisites:	Environment Impact Assesment
5. Competencies:	- To have an idea of the types of exposure and sources of exposure to atmospheric air, how to clean dust and gas mixture, how to prevent the negative impact of agricultural emissions on the state of atmospheric air. - Know and understand the main types of pollutant emissions into the atmosphere. - be able to analyze and assess the degree of danger of the impact of agricultural enterprises on atmospheric air by indicators of the harmfulness of pollutants; - to acquire practical skills in determining the composition of emissions of pollutants from agricultural enterprises and measures to reduce them.
6. Course author	Satova K.M.
7. Basic literature	1. Bredschneider B., Kurfurot I. Protection of the air basin from pollution. - M.: Chemistry, 2009.288 s. 2. Novikov Yu.V. Ecology, environment and people: Textbook for universities. –M .: M .: FOIR-PRESS, 2003. -320 p. 3. Polonsky V.M. Air basin protection. - M .: 2006. -152 p. 4. Stepanovskikh A.S. General ecology. Textbook for high schools. -M.: UNITY. Dana, 2000.510 s. 5. Methodology for calculating atmospheric pollutant emissions from livestock farms and animal farms, 2015. 6. Karlovich I.A. Fundamentals of technogenesis: Prince. 1. Sources and flows of environmental pollution. - Vladimir: Voronezh State Pedagogical University, 2003 .-- 330 p. 7. Karlovich I.A. Fundamentals of technogenesis: Prince. 2. Environmental pollution factors. - Vladimir: Voronezh State Pedagogical University, 2003 .-- 540 p. 8. Panin M.S. Chemical ecology. Textbook for high schools. - Semipalatinsk, Semipalatinsk State University. Shakarima. 2002 .-- 852 p. 9. Stepanovskikh A. S. Applied ecology. Textbook for high schools. –M .: Unity-Dana, 2005. - 751 p. 10. Yushin V.V. and others. Technique and technology of air protection. Textbook for universities. - M .: Higher. school, 2005. –391 p.
8. The content of the discipline. The composition and structure of the atmosphere. Sources of disturbance and air pollution. Types of pollutants. Legislative and regulatory framework of the Republic of Kazakhstan in the field of atmospheric air protection. Classification of sources of emissions of pollutants into the atmosphere, the concepts of WPI, SPZ, KOP. Methods of dust and gas collection. The impact of agriculture on the state of atmospheric air. The main sources of pollution (livestock and poultry farms, industrial complexes for the production of meat, energy and heat-producing enterprises, pesticides used in agriculture, warehouses where seeds are treated with pesticides, and fields where pesticides and mineral fertilizers are applied, as well as ginneries) in the field of agriculture. Carcinogenic and non-carcinogenic priority air pollutants in rural areas. Methods of air quality control. The impact of priority pollutants on living conditions of the rural population.	

1. Basic information about the discipline:	
Name of the discipline	**Methods of processing and recycling agricultural waste**
2. The number of credits	5
3. Prerequisites:	General Ecology
4. Post requisites:	Fundamentals of agribusiness and entrepreneurship, Pregraduation practice
5. Competencies:	To study the basic principles, knowledge and understanding of the need to reduce and prevent the impact of agricultural waste and environmental disturbances on agroecosystems and agricultural products. To know the peculiarities of the

	relationship of agrocenosis organisms with the environment and alternative farming systems. To master the skills to preserve and restore natural and agricultural ecosystems through the processing and disposal of agricultural waste. Own the methods of conservation of the modern agricultural sphere. Be able to develop environmental protection measures. To be able to practically apply the discipline knowledge, they must know the diversity of agricultural waste, methods of processing and utilization of agricultural waste, biosphere resources and food problems, agroecosystems, water pollution in conditions of intensification of agricultural production. To be able to practically apply the knowledge of methods of processing and utilization of agricultural waste, the environmental fundamentals of agricultural production.
6. Course author	A.O. Zhanabergenov, K.K. Shupshibaev
7. Basic literature	1. Barannikov VD, Kirillov N.K. Ecological safety of agricultural products. - M .: Kolos, 2005. 2. Ler R. Processing and use of agricultural waste. -M .: Spike. 1999 .-- 411 p. 3. Sidorenko O.D. Bioconversion of livestock waste. -M.: Publishing House of the Moscow Artists Academy, 2000. - 50 p.
8. The content of the discipline Fundamentals of resource-saving nature management. Legal and economic aspects of management in the treatment of agricultural waste and consumption. Terminology and classification of agricultural waste and consumption. The main methods of processing and disposal of agricultural waste.	

1. Basic information about the discipline:	
Name of the discipline	**Environmental laws and documentation in agriculture**
2. The number of credits	5
3. Prerequisites:	General Ecology
4. Post requisites:	Organic farming, Economy of nature using
5. Competencies:	Knowledge of the basics of nature management, economics of nature management, sustainable development, environmental impact assessment, legal fundamentals of nature management and environmental protection. Possessing the ability to carry out the following professional tasks: knowledge of environmental laws and the design of related documents, participation in research in the field of ecology, nature conservation and other environmental sciences and the agricultural sector, in organizations engaged in educational activities; laboratory research; collection and primary processing of material; participation in field research. Competence for the implementation of public administration in the agricultural sector and in the field of nature conservation and environmental management; services for environmental monitoring, environmental safety and environmental policy. Possession of methods for preparing environmental documentation for environmental impact assessment of various types of project analysis, environmental engineering studies to assess the environmental impact of various types of economic activity, including agriculture, methods for assessing the impact of economic activity on the environment and public health, economic assessment damage and risks to the environment, economic efficiency of environmental measures, fees for the use of natural resources. Implementation of environmental control and auditing activities. Participation in the assessment of environmental impacts, the identification and diagnosis of environmental problems and the interaction systems of the agricultural sector, society and nature, the solution of ecological and geographical problems associated with sustainable development; analysis of private and general problems of the rational use of natural resources, in environmental management in the agricultural sector.
6. Course author	K.K. Shupshibaev
7. Basic literature	1. Urazaev N.A., Vakulin A.A., Nikitin A.V. and other agricultural ecology. - M .: Kolos. 2000 .-- 304 p. 2. The Environmental Code of the Republic of Kazakhstan. January 2007 –Astana. 2007 .-- 327 p.
8. The content of the discipline The ability to use the basics of legal knowledge in environmental activities. Possession of methods for preparing documentation for environmental impact assessment of various types of	

project analysis, conducting environmental engineering studies to assess the environmental impact of various types of economic activity, methods for assessing the impact of economic activity on the environment and public health, assessing economic damage and risks for the natural environment, economic the effectiveness of environmental measures, fees for the use of natural resources. The main environmental laws of the Republic of Kazakhstan and documentation in agriculture.

1. Basic information about the discipline:	
Name of the discipline	**Ecological, hygienic rationing and expertise in agriculture**
2. The number of credits	5
3. Prerequisites:	Environmental monitoring, Ecological methods of analysis in the agricultural sector
4. Post requisites:	Methods of processing and recycling agricultural waste, Pre-graduation practice
5. Competencies:	As a result of studying the discipline, students should learn the basic principles, knowledge and understanding of environmental, hygienic regulation and expertise in agriculture to reduce and prevent the negative impact of environmental violations on agroecosystems and agricultural products. Master the skills of standardization and expertise to preserve and restore natural and agricultural ecosystems. To be able to develop environmental measures taking into account environmental, hygienic standards and expertise. Know the biosphere resources and food problems, agroecosystems, water pollution in conditions of intensification of heat and gas supply to the population. To be able to practically apply the basics of engineering environmental protection, determining the quality of the natural environment and its rationing. Conduct an environmental quality assessment. Know the basics of environmental standardization, examination and certification. Have an idea about: types of environmental activities; principles and rules of environmental protection. To know and understand: regulatory documents on environmental protection; OS quality standards. Be able to: conduct an assessment of the impact of various activities on the OS; assess OS quality through an instrumental approach.
6. Course author	A.A. Zhaglovskaya,, ShupshibaevK.K.
7. Basic literature	1. Butorina M.V., Vorobev P.V., Dmitrieva A.P. and others. Engineering ecology and environmental management. -M .: Logos, 2003. 2. Galanevich A.G. Environmental Impact Assessment and Ecological Expertise // Ecological Expertise. No. 3, M .: 1999. 3. Donchenko V.K., Pitulko V.M., Rastoskuev V.V. and other environmental expertise. -M.: Publishing Center "Academy", 2004. 4. Environmental standards and design rules. Directory. Comp. Yu.D. Maksimenko, V.A. Glukharev. -M .: 1990. 5. The Environmental Code of the Republic of Kazakhstan dated January 9, 2007 No. 212 (as amended by the Laws of the Republic of Kazakhstan dated 12.27.2017 No. 126, 05.24.2018 No. 156).
8. The content of the discipline Principles and rules of environmental protection. OS quality standards. Principles of environmental impact assessment, environmental audit. Features of the assessment of the impact of the proposed activity on the OS. The main principles and the most promising ways to prevent negative environmental consequences during the implementation of projects. Laws of the Republic of Kazakhstan in the field of environmental, hygienic regulation of environmental impact assessment and environmental protection.	

1. Basic information about the discipline:	
Name of the discipline	**English for special purposes**
2. The number of credits	**6**
3. Prerequisites:	Foreign language

4. Post requisites:	Writing a thesis
5. Competencies:	As a result of studying the discipline, students should: -Able to use English at a level that provides free communication, both in the general cultural sphere, and in professional activities with foreign partners, colleagues Have skills (gain experience) in business communication: public speaking, negotiations, meetings, business correspondence, electronic communications, etc .; establishing and maintaining social relationships in the multicultural environment of modern society; the effective implementation of managerial functions in a multicultural environment; solutions to managerial tasks related to operations in global markets in the context of globalization.
6. Course author	Zhaglovskaya A.A.
7. Basic literature	1. Savel'ev L.A. Uchebnoe posobie anglijskogo jazyka "EnglishfortheStudentsofEcology" dlja jekologov. SPb: izd. RGGMU, 2007 - 148 s. 2. Saspugayeva G.Y. Ecology. Textbook. S.Seifullin Kazakh agrotechnical university, 2015, 179 pages 3. Ivanova N.K. - Anglijskij jazyk dlja himikov (fonetika), Ivanovo, "IGHTU", 2007, 100 s. (adres v Internete: http://main.isuct.ru/files/dept/ino/fonetika.pdf) 4. 4.Kutepova M.M. - The world of chemistry / Anglijskij jazyk dlja himikov: Uchebnik: Izd. 4-e. M.: KD Universitet, 2006, 256 s. 5. Serebrennikova Je.I., Krugljakova I.E. - Anglijskij jazyk dlja himikov: Uchebnik: Izd. 3-e. M.: Al'jans, 2009, 400 s. 6. Timofeeva T.V., Potaluj L.V. - Technical Correspondence: Uchebnoe posobie po anglijskomu jazyku, Voronezh: Izd-vo VGU, 2005, 27 s. (adres v Internete: http://window.edu.ru/window catalog/files/r40141/may05070,pdf) 7. K. Harding. English for Specific Purposes. Oxford University Press,2009. 8. Akimova T.A. Jekologija. Chelovek - Jekonomika - Biota - Sreda.-M: JuNITI, 2007.
8. The content of the discipline. Globalization in Education. Grant proposal and policy. Teamwork as a tool for professional communication. Scientific article as a tool of technical communication. Visuals in written academic text. Presentation skills development for participating in a conference and other academic events.	

Appendix 4 Description of Disciplines of the Optional Component

1. Basic information about the discipline:	
Name of the discipline	**General chemistry**
2. The number of credits	5
3. Prerequisites:	School chemistry, General ecology
4. Post requisites:	Environmental monitoring, Ecological, Hygienic Rationing and Expertise in Agriculture
5. Competencies:	Have an idea of the volume of emissions of pollutants of anthropogenic origin; predicting possible changes in the biosphere under the influence of human activities. To know and understand the content of chemical elements in nature; basic characteristics of the atmosphere, hydrosphere and lithosphere; the spread of chemical pollutants in the biosphere; the effect of chemical pollutants on all living things. To be able to distinguish between natural and man-made sources of chemical pollution; evaluate the effect of chemical pollutants on the biosphere and its components; to take and prepare samples for analysis to perform quantitative chemical analysis in natural objects. To gain practical skills in the selection and preparation of samples for analysis; performing quantitative chemical analysis in natural objects.
6. Course author	Department of Physics and Chemistry
7. Basic literature	1. Skalny A.V. Chemical elements in the physiology and ecology of man. -M .: ONIX 21st century. Peace. 2004 .-- 216 p. 2. Tarasova N.P., Kuznetsov V.A. Environmental Chemistry: Atmosphere. Textbook for universities. -M.: IKC "Akademkniga", 2007. - 228 p. 3. Goldovskaya L.F. Environmental chemistry: textbook: -M .: World: 2008. - 294 p. 4. Lozhnichenko OV, Volkova IV, Zaitsev V.F. Ecological chemistry. Textbook for universities. -M .: IC "Academy", 2008. - 272 p. 5. Gusakova N.V. Environmental chemistry. Textbook for universities. - Rostov-on-Don: Phoenix, 2004. -192 p. 6. Lipunov I.N., Nikiforov A.F. Environmental chemistry. Lecture course. - Yekaterinburg: Ural State Technical University, 2006. -319 p. 7. Satova K.M. Ecological chemistry. Textbook. - Astana: KazATU named after S. Seifullina, 2018 .-- 274 p. 8. Afanasyev Yu.A. Ecological chemistry. - M. Publishing House of MNEPU, 2008, -60 p. 9. Vasiliev V.P. Analytical chemistry. Prince 2: Physicochemical methods of analysis. - M.: Bustard, 2004. -384 p. 10. Sadovnikova L.K., Orlov D.S., Lozanovskaya I.N. Ecology and environmental protection during chemical pollution. Tutorial. - M .: Vys. school, - 2006. - 334 p. 11. Panin M.S. Chemical ecology. Textbook for high schools. - Semipalatinsk, Semipalatinsk State University. Shakarima. 2002 .-- 852 p. 12. The environmental code of the Republic of Kazakhstan. - Almaty: Lawyer, 2007 .-- 164 p. As amended 04.15.17. No. 56-VI SAM. 13. Vasiliev V.P. and other analytical chemistry. Laboratory workshop. - M.: Bustard, 2004 .-- 416 p. 14. Trifonov K.I., Devisilov V.A. Physico-chemical processes in the technosphere. - M.: FORUM: INFRA-M, 2007 .-- 240 p.
8. The content of the discipline The chemical basis for the conversion of pollutants in the environment. Introduction to environmental chemistry. The relationship of environmental chemistry with other scientific disciplines. The chemical basis of environmental interactions. Chemical environmental factor. Ecological properties of chemical elements and their compounds. General characteristics of pollutants. The concept of maximum permissible concentration (MPC). Characterization of s-elements, p-elements, d-elements and f-elements. Heavy metals are toxicants in the environment. Release into the environment, forms of existence, transformation in aquatic ecosystems. Toxic effect on living organisms. Major organic pollutants. General characteristics. The relationship of the toxic properties of organic substances and their composition and structure. Hydrocarbons and halogen derivatives. Amines. Nitro compounds. Persistent organic pollutants. Sources of organic pollutants in the environment. Toxic effect. Ecological chemistry and atmospheric problems. Chemistry of the upper atmosphere and the problems of their	

pollution. Chemistry of the lower atmosphere and its pollution. Ecological chemistry and hydrosphere problems. The chemical composition of natural waters.
Problems of water treatment and water treatment. Chemical pollution of natural waters.
The main classes of pollutants. Ecological chemistry and problems of the lithosphere. Chemistry of soil composition. The main soil pollutants. Pollution analysis methods and environmental monitoring.
Modern analytical methods for determining elements in environmental objects. Environmental monitoring. Priority controlled environmental parameters. Ecological monitoring of the state of the environment. The concept and structure of the monitoring system, the principles of its functioning. The main tasks of environmental and analytical monitoring.

1. Basic information about the discipline:	
Name of the discipline	**Ecological aspects of natural science**
2. The number of credits	6
3. Prerequisites:	School Biology Course
4. Post requisites:	Landscape ecology and ecosystems
5. Competencies:	- Know: to assess the possible changes in nature or their consequences from the standpoint of the need to ensure and maintain a healthy ecological environment within the boundaries of a particular geographical system. To analyze environmental objects and methods of protecting the environment from pollution. -Able to argue the introduction of new technological processes in accordance with environmental safety requirements. Recognize the social significance of their future profession, have a high motivation to carry out professional activities. -Master: analyze natural science methods in human areas of activity, problems using theoretical and practical knowledge; - Demonstrate knowledge and understanding in the field of study, including elements of the most advanced knowledge in the field
6. Course author	Nurbaeva N.A.
7. Basic literature	1. Brodsky, A. K. Common ecology. -M .: Academy, 2006. - 256 p. 2. Elaboration and Fundamentals of Ecology: Учеб.пособие / P.A. Perrosova, VP Golov, VI Sivoglazov, EK Stroud. 4th ed., Stereotype. M: Academy 2004. 3. Stadnitsky G. B. Ecology. -M: Высшая школа, 1988. - 270 c. 4. Воронков Н. А. The basics of ecology. -M .: AGAR, 1997. - 87 h. 5. Tarasova N. P., Kuznetsov VA Chemistry circulating medium: Atmosphere. Учебное пособие для вузов. - M .: ИКЦ «Академкнга», 2007. - 228 c. 6. Goldovskaya L. F. Chemistry is a circulating medium. Учебник для вузов. - M .: Мир, 2005. - 296 c. 7. Lojnichenko O. V., Volkova I. V., Zaitsev V. F. Ecological chemistry. Учебное пособие для вузов. - M .: ИЦ «Academy», 2008. -272c.
8. The content of the discipline. A systematic approach to the study of biological, chemical, physical ecology. Objects of the material world and fundamental interactions. Science and its methodology. The origin of scientific knowledge: a materialistic and idealistic worldview. He studies the basic principles of the evolution of life. Human evolution: skilled person, upright person, intelligent person, modern person. Biological patterns and their functioning and sustainable development. Types of terrestrial and aquatic ecosystems. Chemical ecology: the dual role of the chemical industry in the nature – production system. Chemical ecology and environmental problems. Chemical ecology of the atmosphere, hydrosphere, lithosphere. Biogeochemical cycles of the most important elements. Chemistry of pollutants in the environment and methods for their separation, purification and control.	

1. Basic information about the discipline:	
Name of the discipline	**Protection and rational use in biological resources of rural areas**
2. The number of credits	5
3. Prerequisites:	General ecology, Ecology of plants, animals and microorganisms
4. Post requisites:	Economy of nature using, Environmental Laws and Documentation in Agriculture
5. Competencies:	As a result, the student must: know: - about the terminological apparatus and the basic concepts of discipline; - theoretical and methodological foundations of resource science; - main groups, types of agricultural resources (economically useful plants, mushrooms, animals); - synanthropic plant bioresources of Kazakhstan; - measures for the conservation and rational use of agricultural resources of Kazakhstan; be able to: - correctly apply the basic terms and concepts; assess the status and dynamics of biodiversity, predict changes in diversity under the influence of natural and man-made factors; - determine and justify operating standards for various groups of plant and animal resources, measures for environmental optimization of sustainable use of natural resources; - apply modern experimental methods of working with agrobiological objects in the field and laboratory conditions. own: - independently determine the types of agricultural resources of the area: - carry out the counting of plants and animals of agricultural significance. - methods of analysis and assessment of biodiversity at different levels of the organization of the biosphere; methods for monitoring and protecting biodiversity; own methods of search and exchange of information in global and local computer networks.
6. Course author	A.T. Kuatbaev
7. Basic literature	1. Zhanadilov A.Yu. Agricultural ecology. - Tutorial. -Family, Intellect Publishing House. 2011, -182 p. 2. Chernikov V.A. and other Agroecology: a textbook for university students / Ed. V.A. Chernikov, A.I. Chekeres. - M .: KolosS, 2000 .-- 536 p. 3. Mazhaysky Yu.A., Tobratov S.A., Dubenok N.N., Pozhogin Yu.P. Agroecology of technologically polluted landscapes. - Smolensk: Magenta, 2003 .-- 384 p. 4. Chernikov V.A. and other Agroecology: Methodology, technology, economics: a textbook. / Ed. V.A. Chernikova, A.I. Checkeres. - M .: KolosS, 2004 .-- 400 p. 5. Gerasimenko V.P. Workshop on agroecology: a textbook for students of agricultural universities in the specialty "Agroecology". - St. Petersburg: Doe, 2009 .-- 432 p. 6. Kulikov Y.K. Agroecology: a textbook for students of higher education institutions with a degree in Bioecology. - Minsk: Higher School, 2012 .-- 320 p. 7. Urazaev N.A., Vakulin A.A., Nikitin A.V. and other agricultural ecology. - M .: Kolos, 2000 .-- 304 p.
8. The content of the discipline. The phenomenon of biodiversity, species richness and factors of its formation. The concept of biodiversity and its interpretation. Modern views on biological diversity. Convention on Biological Diversity. Modern areas of research on the assessment, conservation of biological diversity. The concept of a systematic approach to the study of the organization of living. Levels of biological systems: species - population - ecosystem - biome. The idea of the interconnectedness and interaction of living systems at different levels. Genetic diversity. View as a universal biodiversity unit. Species diversity. Ecosystem diversity. Aspects of biodiversity conservation. Tasks in the field of biodiversity conservation. The concept of agrobiodiversity. Cartagena Protocol on Biosafety. Nagoya Protocol. Man-made biodiversity. Ex-situ and in-situ conservation. Centers of origin of crops. Food Security and Agrobiodiversity of Kazakhstan. Sustainable agrobiodiversity under climate change. Strengthening human and technical capacity to preserve valuable agrobiodiversity. Monitoring as a	

system for obtaining information on the state of biodiversity in all its manifestations in order to assess its change. Biodiversity monitoring as part of environmental monitoring. Key Trends in Biodiversity.

1. Basic information about the discipline:	
Name of the discipline	**Rational nature management in agriculture**
2. The number of credits	5
3. Prerequisites:	General ecology, Ecology of plants, animals and microorganisms
4. Post requisites:	Economy of nature using, Environmental Laws and Documentation in Agriculture
5. Competencies:	As a result, the student must: know: - provisions of the concept of sustainable environmental and economic development; problems associated with changes in the state of the environment and using the natural resource potential of the territory; - nature management in various sectors of the economy and related environmental problems; the composition of environmental waste and methods for their disposal; methods of wastewater treatment and protection of atmospheric air from pollution, used abroad and in our country, be able to: - freely use scientific and reference literature; - use regulatory literature in the field of environmental management. - calculate the concentration of pollutants at the border of the sanitary protection zone of the enterprise and the volume of maximum permissible emissions; own: - skills of compiling an environmental passport of the enterprise.
6. Course author	A.T. Kuatbaev
7. Basic literature	1. Zhanadilov A.Yu. Agricultural ecology. - Tutorial. -Family, Intellect Publishing House. 2011, -182 p. 2. Tischler V. Agricultural ecology. -M .: 1971. 3. Chernikov V.A. and other Agroecology: a textbook for university students / Ed. V.A. Chernikova, A.I. Checkeres. - M .: KolosS, 2000. -536 p. 4. Mazhaysky Yu.A., Tobratov S.A., Dubenok N.N., Pozhogin Yu.P. Agroecology of technologically polluted landscapes. - Smolensk: Magenta, 2003 .-- 384 p. 5. Chernikov V.A. and other Agroecology: Methodology, technology, economics: a textbook. / Ed. V.A. Chernikova, A.I. Checkeres. - M .: KolosS, 2004 .-- 400 p. 6. Gerasimenko V.P. Workshop on agroecology: a textbook for students of agricultural universities in the specialty "Agroecology". - St. Petersburg: Doe, 2009 .-- 432 p. 7. Kulikov Y. K. Agroecology: a textbook for students of higher education institutions with a degree in Bioecology. - Minsk: Higher School, 2012 .-- 320 p. 8. Zubkov A.F. Agrobiocenological phytosanitary diagnostics. -SPb .: 1995.

8 The content of the discipline

Types of nature management. Resource, sectoral and territorial use of natural resources, the basics of resource use of natural resources: the natural resource and ecological-economic potential of the Earth. Principles of environmental management. The natural environment of human society and its natural potential. The concept of natural capital as a set of natural values, its relative limitations. Natural limitations of development strategies. Global environmental problems in the socio-economic aspect. Criteria for assessing the state and sustainability of natural and natural-technogenic systems. The role of natural factors in the formation of national wealth. Natural resource potential of the territory and its use. Specially protected natural areas. Resources: climatic, mineral, water, land, forest, biological. Land resources, features of the use of land for various purposes, agricultural land. Water resources and water use.

Prospects for rational water use. State system for monitoring natural resources, cadastres. Methodology for monitoring and compiling a cadastre of land resources. State monitoring of water bodies. Sectors of the economy as nature users. Features of nature management in the sectors of mining and industrial, productive nature management and land use. Features of agricultural nature management, water consumption of crops. Features of commercial, recreational, urban nature management. Features of environmental management in the transport industry. Environmental reporting in enterprises. Ecological passport. Classification of environmental waste. Criteria for classifying waste as hazard class. The scale of waste generation and accumulation. General concept of the economic mechanism of environmental management and its tools. Economic instruments for environmental protection and nature management. The problem of the correlation of economic and policy instruments in environmental management and its solution in the countries of the world. Eco-restructuring and environmental modernization of production. International relations in the field of environmental management and environmental protection. The participation of countries in global environmental programs.

1. Basic information about the discipline:	
Name of the discipline	**Soil protection**
2. The number of credits	**5**
3. Prerequisites:	General ecology
4. Post requisites:	Pastures: ecology, conservation and restoration
5. Competencies:	- The ability to use the concepts of soil science, the basic methods of studying soils, knowledge of morphology, soil properties, knowledge of the main pathogens of plant diseases, and sanitary and hygienic norms of the soil in the practice of scientific research. - The acquisition of practical skills in boxing, as well as working with drugs, microscopes, thermostats, soil determinants. - To be able to compare, formulate conclusions, build their own arguments, express and justify their position on soil science. - When communicating, be able to comply with personal hygiene standards, as well as standards for soil quality. - In the field of education - the ability to analyze the key problems of soil science from an environmental point of view.
6. Course author	Mukhametkarimov K.M.
7. Basic literature	1. Almanova JS, Kashkarov AA Okran Street The course is for students of special disciplines «Ecology». -Astana. KazATU, 2014. -101 pp. http://portal.kazatu.kz/e-books/content/7SyPO7z6D3RMLvnvYTEm/index.pdf 2. Gennadyev AN Geography on the base of the land. Uchebnik - 2 results / AN Gennadyev, MA Glazovskaya. - M .: Высшая школа, 2008. - 462 с. 3. Sokolov IA Modern Problems of Genetic Desire. Novosibirsk: Humanities, 2004. - 288 pp.
8. The content of the discipline. Fundamentals of soil science, the basic laws of soil cover formation, the relationship of soil science with the sciences of the Earth, ecology, agriculture, crop production, biology, geology, ecology and other sciences. The main soil-forming processes, soil-forming factors and environmental factors and their influence on soil formation, its physical and chemical properties. The main types of soils, their identification, assessment of the potential of soils and the development of measures for the effective environmental use of soil resources and the determination of soil bonitet score and features of the economic use of various soils. Land resources and basic methods of protecting soils from harmful effects, assessing the influence of soil formation factors on soil formation and development and its properties.	

1. Basic information about the discipline:	
Name of the discipline	**Livestock processing technology**
2. The number of credits	5
3. Prerequisites:	General Ecology
4. Post requisites:	Methods of processing and recycling agricultural waste
5. Competencies:	To know and understand the biological characteristics and economically useful traits of agricultural animals; breeding and feeding methods for agricultural animals; technological parameters of the content of agricultural animals; methods of

	keeping and rational feeding of agricultural animals; reproduction methods of agricultural animals; be able to draw up a plan for breeding and breeding work with agricultural animals; own methods of selection and selection of agricultural animals; compile reports on livestock, products and feed accounting; analyze the milk and meat productivity of the herd; plan the production of milk and beef; own technological methods for the production of milk, meat, wool, eggs. To own technologies for the production of milk and dairy products, meat and meat products and eggs and egg products.
6. Course author	The Department of Technology and Processing of Livestock Production
7. Basic literature	1. Makhatov B. and other General livestock. - Almaty, 2012. 2. Antal A., Benefit R., Bulla Y. Cultivation of young cattle. - M: Agropromizdat, 2016 .-- 185 p. 3. Arzumanyan EA Livestock. - M .: VO Agropromizdat, 2017 .-- 205 p. 4. Bagriy B.A. Breeding and selection of beef cattle. - M .: Agropromizdat, 2016 .-- 256 p. 5. Espolov T.I., Kuvatov R.Yu., Kerimova U.K. Improving the efficiency of agriculture in Kazakhstan in the context of integration with foreign markets: a Textbook. - Almaty: Publishing House "Scientific Research and Consulting Institute of Agribusiness at KazNAU", 2014. - 265 p.
8. The content of the discipline. Livestock production technology. Horse breeding production technology. Camel production technology. Technology of production of sheep and goats. Pig production technology. Technology for the production of poultry products. Technology for the production of beekeeping, fish farming and rabbit farming.	

1. Basic information about the discipline:	
Name of the discipline	**Agrochemistry and soil science**
2. The number of credits	**5**
3. Prerequisites:	General Chemistry, General Ecology, Soil Science
4. Post requisites:	Organic farming, Environmental analysis methods in the agricultural sector
5. Competencies:	The study of agrochemistry will allow one to master the specialty deeper, study and comprehend other special disciplines, develop and improve the technology of cultivating crops, and develop methods for purposefully increasing soil fertility in order to increase productivity and improve the quality of crops and the environmental safety of the environment. The purpose of the discipline "Agrochemistry" is to familiarize students with the possible negative impact of agricultural chemicals on the properties and fertility of soils, the quantity and quality of products; the study of ways to prevent the possible negative impact of chemicals in the agrocenosis and in the biosphere; determination of the functions of agricultural chemistry in solving environmental problems in the biosphere. To know and understand (descriptor A): The chemical composition of plants, the role of the main nutrients in crop formation and crop quality, types of nutrition, biological characteristics of nutrition, frequency and methods of its regulation. The composition and properties of soils and fertilizers, the characteristics of the behavior and transformation of fertilizers in the soil, their influence on the properties of soil and plants. The essence of the soil-plant-fertilizer relationship, modern methods for diagnosing conditions of soil nutrition of plants, criteria for assessing effective soil fertility, methods for conducting chemical analyzes of soils and plants. Understand that fertilizers are the most important food sources for plants, with a deficiency of which plants cannot form a full-fledged crop neither in quantity nor in quality (deficiency of protein, gluten, sugars, vitamins). Understand that environmental problems with the use of fertilizers arise in the absence of knowledge and skills on how to use them professionally competently, avoiding excessive accumulation. To be able (descriptor B): based on the results of chemical analyzes of soils and plants, correctly assess the state of effective fertility and, on this basis, determine what fertilizers, when and in what way should be applied to ensure, under the prevailing conditions, the maximum productivity of the cultivated crop while improving its quality. Apply a variety of methodological approaches to ensure the environmental safety of agrolandscapes. Based on the knowledge gained, be

	able to give an objective assessment of the ecological state of soils and plants. Own (descriptor C): at this stage, it is important to obtain good theoretical training and knowledge to use them in the future to develop the most optimal fertilizer application systems and to have targeted management of soil fertility. Have communication skills (descriptor D): use the obtained theoretical knowledge to analyze and substantiate conclusions on the theory and practice of fertilizer application, solve practical problems, search, analyze and evaluate professional information, scientific reports, specialized literature, open sources, creativity in professional activities.
6. Course author	Chernenok V.G.
7. Basic literature	1. Yagodin B.A., Zhukov Yu.P., Kobzarenko V.I. Agrochemistry textbook [Electronic resource]: - SPb .: Doe, 2016. - 584 p. 2. Kidin V.V. Agrochemistry: Textbook. - M.: SIC INFRA-M, 2015 .-- 351 p. 3. Mineev V.I. Agrochemistry, 2004, 2017. 4. Smirnov P.M., Petersburg A.V. Agrochemistry. -M .: 1975. 5. Yagodin B.A. Agrochemistry. -M .: Kolos, 1982. 6. Eleshev R.E., Ivanov A.L. Phosphorus soil regime of Kazakhstan. - Alma-Ata: Science, 1995, 1997.
8. The content of the discipline. Introduction to agrochemistry. Optimization of plant nutrition, soil fertility management. Productivity and crop quality. Science-based fertilizer use. The relationship of plants, soil and fertilizers. The process of growing crops. Methods of using fertilizers. Methods for the efficient use of fertilizers. Ecological use and use of fertilizers.	

1. Basic information about the discipline:	
Name of the discipline	**Integrated water resources management**
2. The number of credits	5
3. Prerequisites:	General Chemistry, Climate Change and Green Economy
4. Post requisites:	Organic farming, Economy of nature using
5. Competencies:	Know: the importance and functions of the hydrosphere, the distribution of fresh water on Earth, the chemical composition and structure of natural waters, the problems and sources of anthropogenic pollution of water resources, international water quality standards, the principles of environmental monitoring of surface waters in the Republic of Kazakhstan, methods of treating natural and waste waters and types of treatment facilities, the legislative framework for the protection and rational use of water resources, standards for the quality of natural waters, effective methods for treating industrial and waste water to comply with established of established environmental standards. To be able to: draw conclusions about the state and methods of protecting water resources, operate on acquired knowledge and apply them in the process of professional activity, determine substances that pollute natural waters. Own: methods for determining the composition and properties of natural and wastewater, rules for standardizing water quality and water consumption
6. Course author	A.Sh. Utarbaeva, G.K. Satybaldieva
7. Basic literature	1. The Water Code of the Republic of Kazakhstan (with amendments and additions as of June 15, 2015). http://adilet.zan.kz/rus/docs/K030000481_ 2. The Environmental Code of the Republic of Kazakhstan (with amendments and additions as of June 15, 2015) http://adilet.zan.kz/rus/docs/K070000212. 3. Zhaparova SB, Bekpergenova Zh.B. Water protection. Tutorial. -Astana. 2013. 4. Environmental indicators for monitoring and environmental assessment. - Committee on Statistics, 2015. 5. Strelkov A.K., Teplykh S.Yu. Water Conservation: A Textbook. -M .: Publishing house ACB. 2015, -240 s. 6. Maksimenko Yu.L., Kudryashova G.N. Water Conservation: A Textbook. - M.: Publishing House ACB, 2015 .-- 256

	p.
8. The content of the discipline The composition and structure of the hydrosphere. The value of the hydrosphere. The value of the oceans. Fresh water distribution. The formation of the chemical composition of natural waters. The state of water use by sectors of the economy in the world and Kazakhstan. Problems of anthropogenic pollution of the hydrosphere. Use and protection of water resources of the Republic of Kazakhstan. Prospects for sustainable water supply. Water quality and water uses. Classification of water treatment methods. The legal basis for the use of water resources of the Republic of Kazakhstan. Tasks and principles of water legislation of the Republic of Kazakhstan.	

1. Basic information about the discipline:	
Name of the discipline	**Ecological safety of agricultural products**
2. The number of credits	5
3. Prerequisites:	General ecology, General chemistry
4. Post requisites:	Environmental monitoring, Ecological, Hygienic Rationing and Expertise in Agriculture
5. Competencies:	To study the theoretical aspects and identify the nature of the pollution of agricultural land located near the agricultural sector. Own methods of analysis of the assessment of environmental objects (water, air, soil) of agricultural land located near the agricultural sector. To be able to analyze the processes occurring in the components of the biosphere. Use methods for the detection and quantification of major agricultural pollutants. To be able to practically apply knowledge on agroecological monitoring to assess the quality of the natural environment to predict changes in environmental sustainability to anthropogenic and technogenic effects.
6. Course author	Satybaldieva G.K., Satova K.M.
7. Basic literature	1. Kuznetsov M.S. Erosion and soil protection: a textbook for universities. - Mosk. state un-t them. M.V. Lomonosov. - 2nd ed. -M.: Publishing House Colossus, 2004. -350s. 2. Barannikov V.D. Environmental safety of agricultural products: a textbook for university students. -M .: KolosS, 2005. -350 p. 3. Kalygin V.G. Life safety. Industrial and environmental safety in man-made emergencies. -M.: Colossus, Chemistry, 2006. -520 p. 4. Kaplin V.G. Basics of ecotoxicology: a textbook for students. -M .: KolosS, 2007. -231 p. 5. Gerasimenko V.P. Workshop on agroecology: a textbook for students of agricultural universities enrolled in the specialty 110102-Agroecology. -SPb .: Doe, 2009.427 s. 6. Semenova II, Akberdina R.Kh. Fundamentals of Environmental Toxicology: a course of lectures for the ecologist. university specialties). -Cheboksary: Cheboksary Phil. RGSU, 2009. -102 p. 7. Vitol I.S. The safety of food raw materials and food: studies. for university students. -M .: DeLi print, 2010. -350 p. 8. Kiryushin V.I. The theory of adaptive landscape farming and the design of agrolandscapes. –M .: Colossus, 2011. - 442 p. 9. Kim I.N. The Safety of Food Raw Materials and Food: A Training Manual. - 1 part. -M .: Yurayt, 2018.230 s.
8. The content of the discipline The essence and specificity of the subject is to determine the various pollutants of environmental objects (water, air and soil) and their impact on agricultural products. Features of the organization of environmental monitoring of different hierarchical levels. Methodology for organizing the collection of information for a comprehensive assessment of agricultural pollution. Assessment of the degree of anthropogenic impact on agricultural territories. Interpretation of information data and organization of forecasting pollution of agricultural land territories to ensure food and environmental safety.	

1. Basic information about the discipline:	
Name of the discipline	**Ecological safety of crop and livestock products**
2. The number of credits	5
3. Prerequisites:	General ecology, General chemistry
4. Post requisites:	Environmental monitoring, Ecological, Hygienic Rationing and Expertise in Agriculture
5. Competencies:	As a result of studying the discipline Environmental safety of crop and livestock products, students should study the theoretical aspects and identify the nature of the pollution of crop and livestock products by various harmful substances due to many interconnected processes with different intensities in adjoining environments and ecosystem components. The growth of the direct action of chemicals and the complexity of the manifestation of these effects.
6. Course author	A.A. Zhaglovskaya
7. Basic literature	1. Chulkin V.A. Agrotechnical method of plant protection (environmentally friendly plant protection): a training manual for agricultural. universities. -M .: Marketing; Novosibirsk: UKEA, 2000. -335 p. 2. Stepanov D.V. Environmental selection in livestock: a textbook for universities. 2nd ed. -M .: Kolos, 2006.443 p.
8. The content of the discipline The nature, specificity and properties of environmental safety of crop and livestock products. Based on the principles of environmental protection activities, the main directions for improving environmental safety and practical ways to implement them have been developed while improving technologies and technical means of agricultural production and environmental safety of crop and livestock products. The production of environmentally friendly products is a key task in the greening of agricultural activities. Ecologically safe agricultural products, the "life cycle" (production - processing - consumption), compliance with established organoleptic, general hygiene, technological and toxicological standards, the absence of negative effects on human, animal and environmental health. The concept of "environmentally friendly products." Assessment of the state of agroecosystems. Valuation of agricultural products. Sanitary and hygienic assessment of food raw materials and food products of plant growing and animal husbandry. The decline in product quality due to violation of nutritional conditions and the livelihoods of agricultural plants and animals. Measures to improve the quality of agricultural products.	

1. Basic information about the discipline:	
Name of the discipline	**Geoecology**
2. The number of credits	5
3. Prerequisites:	General ecology, General chemistry
4. Post requisites:	Environmental monitoring, Ecological, hygienic rationing and expertise in agriculture
5. Competencies:	As a result of studying the discipline, the student should know: the basics of geoecology, the features of regional geoecology, the spatial organization of natural and technical geosystems, the possibility of human adaptation to the conditions of existence in destabilized geosystems, the geoecological principles of design. To be able to: assess the geo-ecological situation, use the basic methods of geo-ecological assessments of the state parameters of natural-technical geosystems, acquire practical skills to solve regional geo-ecological problems in the socio-economic, political and legal fields.
6. Course author	J.K. Bakhov
7. Basic literature	1. Geoecological mapping: textbook for students. universities / ed. B.I. Kochurova. - M.: Academy, 2009. -192 p. 2. Sturman V.I. Environmental mapping. allowance for students. universities. - M .: Aspect-Press, 2003 .-- 251 p. 3. Berlyant A.M. Cartography. - M .: Aspect-Press, 2001 .-- 311 p. 4. Vostokova E.A. Ecol. space-based mapping information. - M .: Nedra, 1988. –223 p. 5. Tsipileva T.A. Geographic Information Systems: Textbook. - Tomsk: Tomsk Interuniversity Center for Distance Education, 2004. -162 p. 6. Tsvetkov V.Ya. Geoinformation systems and technologies. - M .: FiS, 1998 .-- 368 p. 7. Linnik V.G. Building GIS in physical geography. - M.: Publishing. Moscow State University, 1990 .-- 80 s.

	8. Chigarkin A.V. Introduction to Applied Ecology. Tutorial. -Almaty. 2002. 9. Skupchenko VB Sokolova L.O. Bioindication of the environment: study. allowance. –SPb. Publishing House: SPbGLTU, 2009.
8. The content of the discipline Theoretical and methodological foundations of geoecology, environmental properties of the environment and anthropogenesis of the region; ecosystem productivity and dynamics, degree of ecological sustainability of ecosystems. Geoecological zoning, patterns of geoecological differentiation of the region. Achieving high quality information on geo-ecological systems. The final stages of environmental education, knowledge of the geoecological state and patterns of spatial differentiation of natural and technical geosystems, assessment of the prospects for the development of regional geoecological situations.	

1. Basic information about the discipline:	
Name of the discipline	**Landscape ecology**
2. The number of credits	5
3. Prerequisites:	General ecology
4. Post requisites:	Organic farming, Economy of nature using
5. Competencies:	As a result of training, students should: know: - theoretical and methodological provisions of landscape ecology; - patterns of organization and spatial and temporal dynamics of landscapes, their resistance to external influences; - geophysical, geochemical and environmental features of the functioning of landscapes; - The main environmental functions of landscapes; be able to: - identify problems associated with the transformation of matter and energy in landscapes; - determine the parameters characterizing the ecological state of landscapes; - analyze and evaluate the ecological state of landscapes. own: - special landscape and environmental terminology; - general methodological techniques of landscape-ecological research; - basic skills for assessing the ecological state of landscapes.
6. Course author	A.A. Zhaglovskaya, A.T. Kuatbaev
7. Basic literature	1. Slyusarev V.N., Terpelets V.I., Barakina E.E. Landscaping. - Training method. benefits - Krasnodar: KubSAU, 2013 .- - 58 p. 2. Lopyrèv M.I., Makarenko S.A. Agrolandscapes and Agriculture: Textbook. Voronezh: VGAU, 2001 .-- 168 p. 3. Golovanov A.I., Kozhanov E.S., Sukharov E.I. Landscaping: a textbook for students. higher educational institutions. - M.: KolosS, 2005 .-- 216 p. 4. Sabo E.D., Theodoronsky V.S., Zolotarevsky A.A. Hydrotechnical land reclamation of landscape construction objects: textbook for students. higher textbook. Head - M.: Publishing. Center "Academy", 2008. - 336 p. 5. Slyusarev V.N., Terpelets V.I., Osipov A.V. Geology: study guide (electronic. Study guide at the educational portal of KubSAU). - Krasnodar: KubSAU, 2012 .-- 131 p.
8. The content of the discipline The development of landscape ecology as a science, its main directions; the relationship between biota and abiotic components within ecosystems; spatial structures of ecosystems of all hierarchical levels (from local to global); main areas of application of landscape and environmental concepts. Acquaintance with international programs providing tasks from the field of landscape ecology.	

1. Basic information about the discipline:	
Name of the discipline	**Sustainability and Agroecosystem Management**
2. The number of credits	5
3. Prerequisites:	General Ecology
4. Post requisites:	Pregraduation practice
5. Competencies:	Own methods of analyzing ecological processes in agroecosystems, setting specific tasks and priorities for protecting the environment and society, knowledge on the laws of development of the biosphere and the conditions of anthropogenic and technogenic impact on nature and the agricultural sector; To be able to analyze the processes occurring in the components of the biosphere, agricultural sector and use the methods of detection and quantification of the main pollutants in the environment, to develop environmental measures for sustainable development and management of agroecosystems.
6. Course author	Zhanabergenov A.O.
7. Basic literature	1. Galanevich A.G. Environmental Impact Assessment and Ecological Expertise // Ecological Expertise. No. 3, M .: 1999. 2. Environmental standards and design rules. Directory. Comp. Yu.D. Maksimenko, V.A. Glukharev. -M .: 1990. 3. The Environmental Code of the Republic of Kazakhstan dated January 9, 2007 No. 212 (as amended by the Laws of the Republic of Kazakhstan dated December 27, 2017 No. 126, May 24, 2018 No. 156).
8. The content of the discipline Sustainability and Agroecosystem Management, the nature and specificity of methods for analysis, assessment and prediction of pollution in the agricultural sector. Features of the organization of monitoring of different hierarchical levels. Methodology for organizing the collection of environmental information for a comprehensive assessment of pollution in the agricultural sector. Determination of the degree of anthropogenic and technogenic impact on the environment. Determining the quality of the natural environment at the local, regional and global levels. Interpretation of information data using modern information systems for predicting environmental pollution with the goal of sustainable development and management of agroecosystems, rational nature management and environmental safety.	

1. Basic information about the discipline:	
Name of the discipline	**Ecological methods of analysis in the agricultural sector**
2. The number of credits	5
3. Prerequisites:	General ecology, General chemistry
4. Post requisites:	Environmental monitoring, Ecological, hygienic rationing and expertise in agriculture
5. Competencies:	To have an idea of the features of each method, the intricacies of the operation of modern devices, for which it is necessary to know the device structure and the principles of their operation. To know and understand the basics of qualitative and quantitative analysis, natural and human impacts on the environment of the agricultural sector. To be able to conduct laboratory experiments with environmental objects, for which you need to master the instrumental methods of analysis. To acquire practical skills in the preparation of solutions of acids, salts and alkalis, the selection and preparation of samples for analysis; perform quantitative chemical analysis.
6. Course author	K.M.Satova
7. Basic literature	1. Lipunov I.N., Nikiforov A.F. Environmental chemistry. Lecture course. - Yekaterinburg: Ural State Technical University, 2006. -319s. 2. Vasiliev V.P. Analytical chemistry. Book 2: Physicochemical methods of analysis. - M.: Bustard, 2004. -384 p. 3. Tsitovich I.K. Analytical chemistry course. - SPb .: Doe, 2004 .-- 496 p. 4. Vasiliev V.P. and other analytical chemistry. Laboratory workshop. - M.: Bustard, 2004 .-- 416 p. 5. Fedorov A.A., Kaziev G.Z., Kazakova G.D. Methods of chemical analysis of environmental objects. - M.: KolosS,

	2008 .-- 118 p. 6. Satova K.M. Physicochemical methods in agrochemistry. UMKD. - Astana: KATU. - 2010 .-- 104 s. 7. Mineev V.G., Sychev V.G., Amelyanchik O.A. and other Workshop on agrochemistry: Textbook. - 2nd ed. / Ed. Academician of the Russian Academy of Agricultural Sciences V.G. Mineeva. - M.: Publishing House of Moscow State University, 2001. -689 p. 8. The environmental code of the Republic of Kazakhstan. - Almaty: Lawyer, 2007 .-- 164 p. As amended on 15.06. 2017 year 9. Goldovskaya L.F. Environmental chemistry. Textbook for high schools. - M .: Mir, 2005 .-- 296 p.
8. Discipline content ntroduction to environmental analysis methods. Methods of controlling the degree of environmental pollution. Methods for determining the quality of agricultural and industrial products. Modern physicochemical methods. General characteristics of environmental analysis methods in the agricultural sector. Optical analysis methods. Absorption spectroscopy. Refractometric and polarimetric methods of analysis. Emission spectral analysis. Conductometry. Potentiometry. Coulometry Polarography. Chromatography.	

1. Basic information about the discipline:	
Name of the discipline	**GIS technology in agriculture**
2. The number of credits	5
3. Prerequisites:	General ecology
4. Post requisites:	Ecological, hygienic rationing and expertise in agriculture, Methods of processing and recycling agricultural waste
5. Competencies:	As a result of studying the discipline, students should know the features and specifics of the main cartographic projections and distortions characteristic of small-scale ecological and geographical maps. Features of the creation and use of environmental maps. To be able to apply methods of studying and using ecological-geographical maps. Perform basic cartometric and graphical work on cards. Build and analyze plans, profiles, cartographic grids and maps using various construction methods. Own methods of processing, analysis and synthesis of field and laboratory environmental information and use theoretical knowledge in practice.
6. Course author	Zhanabergenov A.O.
7. Basic literature	1. Geoecological mapping: textbook for students. universities / ed. B.I. Kochurova. - M.: Academy, 2009. -192 p. 2. Sturman V.I. Environmental mapping. allowance for students. universities. - M .: Aspect-Press, 2003 .-- 251 p. 3. Berlyant A.M. Cartography. - M .: Aspect-Press, 2001 .-- 311 p. 4. Vostokova E.A. Environmental mapping based on space information. - M .: Nedra, 1988. 5. Tsipileva T.A. Geographic Information Systems: Textbook. -Tomsk: Tomsk Interuniversity Center for Distance Education, 2004. - 162 p.
8. The content of the discipline Introduction to GIS technology. GIS and agriculture. The basics of cartography. Maps and agroecology. Volumes and variety of cartographic products. Large-scale and small-scale maps. Thematic cartographic materials. Remote shooting. Modern directions of ecological and geographical research for the agricultural sector. Agroecotourism and cartographic training.	

1. Basic information about the discipline:	
Name of the discipline	**Economy of nature using**
2. The number of credits	5
3. Prerequisites:	Ecological biogeography
4. Post requisites:	Methods of processing and recycling agricultural waste, Pre-graduation practice

5. Competencies:	Have an idea of the negative effects caused by industrial enterprises. Ecologization of technological industrial enterprises, the use of knowledge gained in their activities. Assess the environmental status of industrial sites. Use the basic methods of environmental assessments of the state parameters of natural-technical systems. Carry out calculations and predict changes in environmental sustainability to anthropogenic impact. Ecology as a theoretical basis for nature conservation and rational nature management. To be able to analyze the processes occurring in the components of the biosphere; identify, identify and anticipate the negative impact caused by industrial enterprises; greening technological industrial enterprises. Fundamentals of nature management and environmental protection, methods of economic assessment of natural resources, basic concepts and categories of environmental economics. Comprehensive economic assessment of natural resources, taking into account environmental protection. Effective management of natural resources and the use of income from the primary sector of the Republic of Kazakhstan. The use of an integrated approach in the study of economic problems of environmental management.
6. Course author	SatybaldievaG.K., Shupshibaev K.K.
7. Basic literature	1. The Environmental Code of the Republic of Kazakhstan dated 9.01. 2007. 2. Anuchin V.A. Environmental economics. The theoretical aspect. - M.: Thought, 1998 .-- 293 p. 3. Maximum permissible concentrations (MPC) of pollutants in the atmospheric air of populated areas of GN 2.1.6.695–98 of the Republic of Kazakhstan 3.02.036 99. 4. Golitsin A.N. Industrial ecology and monitoring of environmental pollution. –M .: Higher school. 2010. -336 p. 5. Denisov VV Industrial ecology. -M .: High school. 2007. -720 p. 6. Gutenev V.V., Denisov V.V., Kamyshev A.P., Moskalenko A.P., Nagibeda B.A., Osadchy S.Yu., Khorunzhiy B.I. Industrial ecology. -M .: "Mart", 2007. - 368 p. 7. Tonkopiy M.S. Ecology and environmental economics. Almaty, 2003. 8. Glushkova V.G., Makar S.V. Environmental Economics: A Textbook for Bachelors. - 2nd ed., Revised. and add. - M.: Yurayt Publishing House, 2013 .-- 588 p. 9. Bobylev S.N., Khojaev A.Sh. Environmental Economics: Textbook. - M .: INFRA-M, 2004 .-- 501 p.
8. The content of the discipline Natural science and economic foundations of environmental economics. General characteristics of the natural resource potential and the main environmental problems of the Republic of Kazakhstan. The content of existing economic mechanisms for environmental management. Problems and prospects of developing a system of environmental management and environmental protection in the Republic of Kazakhstan. Natural resource potential of the Republic of Kazakhstan. Fuel and energy and mineral resources of the Republic of Kazakhstan. The experience of using the most justified effective ways of rational use of natural conditions and resources and environmental protection, taking into account the environmental, socio-economic consequences of the interaction of nature and society.	

1. Basic information about the discipline:	
Name of the discipline	**Fundamentals of agribusiness and entrepreneurship**
2. The number of credits	5
3. Prerequisites:	General ecology, Environmental monitoring
4. Post requisites:	Pre-graduation practice
5. Competencies:	On the basics of agribusiness, have an idea: the production technology of the main types of agricultural products; Means of mechanization of the main technological processes; methods of economic research, analysis approaches; regulatory framework for planning; supply and demand; competitiveness; financial security of the enterprise. know: the theoretical foundations and patterns of organization of production and enterprise management, the principles and methods of rational organization of production and management processes in the enterprise;

	be able to: carry out the design of the organization and production management system and organize the work of production teams; have skills: analysis of the state of development of agriculture, industries and enterprises; formulate conclusions and predict the development prospects of business entities in a market environment; identify socially significant problems in the development of agriculture; economic feasibility of effective projects. The purpose of studying the discipline "Economics of Entrepreneurship" is the formation of a complex of knowledge, skills, competencies required by a modern entrepreneur. As a result of studying the discipline, the student must: have an idea: about the theoretical and methodological foundations of entrepreneurship; on the process of organizing entrepreneurial activities and evaluating its effectiveness; on state mechanisms for regulating and supporting the development of entrepreneurship. know: the mechanism of functioning of organizations (firms) of various legal forms; culture of contractual relations, entrepreneurial code of ethics; psychology of entrepreneurship, elements of business communication; reasons, factors and conditions for termination of business. be able to: organize a business and manage it; make decisions in the process of functioning of entrepreneurial activity, conclude agreements, make decisions on the organization and functioning of entrepreneurial activity; calculate the level of risk, assess the business activities, own: skills in applying various techniques and tools in a business management system; personnel assessment methods; risk management methods; methods for assessing the effectiveness of entrepreneurial activity.
6. Course author	Z.B. Oraztaeva, G.K. Narbaeva
7. Basic literature	1. Abdildin S.A. Organization of agribusiness. Textbook. 2001. 2. Ryazanova V.A. Organization and production planning. Tutorial. 2010. 3. Taikulakova G.S. Economics and organization of production. Textbook. 2012. 4. Oraztaeva Z.B. Organization of agribusiness. Workshop 2010. 5. Seydakhmetov AS, Yelshibekova K. Zh. Entrepreneurship. Tutorial. -Almaty: Economics, 2010. 6. Organization of entrepreneurial activity / Edited by S. Gryadov. - M .: KolosS, 2003. 7. Entrepreneurship. / Ed. V.Ya. Gorfinkel, G.B. Pole, V.A. Shwandara. - M.: 2008. 8. Toksanova A.N. Fundamentals of Entrepreneurship. - Astana, 2007. 9. Gorfinkel V.Ya. et al. Enterprise Economics. Textbook. - M.: 2001. 10. Kuzmina E.E. Organization of entrepreneurial activity. Study Guide for Bachelors. –M .: 2013.
8. The content of the discipline	Organizational and economic foundations of peasant farming or farming, AO, cooperatives, LLP. Organization and regulation of labor in the enterprise. Organization of remuneration. Organization of production in the main sectors of crop production. Organization of the production and use of feed. Organization of cattle breeding. Organization MTP, AP. Organization of processing agricultural products. Organization of product sales. State support for the agro-industrial complex. Entrepreneurship: concept, essence, basic types and organizational forms. Resource potential of an organization (firm). Rationing and remuneration. Costs and financial performance of the organization (company). Economic efficiency of the organization (company) and entrepreneurial projects. Marketing and organization management. State support for entrepreneurship and its infrastructure. Entrepreneurship financing. Business planning in the system of entrepreneurial activity. Risks in entrepreneurial activity. Organization of business transactions. Responsibility of business entities. Risks in entrepreneurial activity. Entrepreneurial secret and ways to protect it. Termination of business.