Non-commercial joint-stock company «Kazakh National Agrarian Research University»

APPROVED AGREED Chairman of the Board - Rector Deputy Chairman of the Board A. Kurishbaev LLP «SPC of Agricultural Engineering» 2024 y. D.Karmanov 2024 y. « a »

EDUCATION PROGRAM

«8D08701 - Agricultural Machinery and Technology»

Awarded degree: Doctor of Philosophy, PhD under the educational programme «8D08701 - Agricultural Machinery and Technology» (scientific-pedagogical direction)

ALMATY, 2024 y.

Approved at the meeting of the Department "Agricultural machinery and mechanical engineering"

Protocol № <u>6</u> «<u>12</u>» of ____ 2024 y.

Head of the department _______ Zh.Zhumagulov

Considered at the meeting of the Academic Committee of the Faculty «Engineering technical»

Protocol № <u>6</u> « <u>26</u> » <u>o1</u> 2024 y.

Chairman of the AC of the faculty ______U. Ibishev

Reviewed by the Educational Methodological Council of the University and recommended to the Academic Council Protocol Nº 4 « o1 » o2 2024 v.

Chairman of the EMC of the University ______ A. Abdyrov

The educational program was approved at a meeting of the Academic Council of KazNARU Protocol No. 9 dated " of " of 2024 v.

Developers:

Dean of the faculty

Head of the department

PhD, professor

Doctoral student

Graduation

Employers: Deputy Chairman of the Board LLP «SPC of Agricultural Engineering»

Agreed: Head of the educational program planning office

L.Aldibaeva

Zh. Zhumagulov

K. Kalym

I.Mizanbekov

K.Sugurov

D. Karmanov

Rymondury

Zh. Kussainova

Field of application

Designed for the implementation of the training of bachelors in the educational program «8D08701-Agricultural machinery and technology» in NC JSC "Kazakh National Agrarian Research University".

Regulations

The Law of the Republic of Kazakhstan "On Education" dated July 27, 2007 No. 319-III, as amended and supplemented on July 4, 2018.

The Law of the Republic of Kazakhstan "On Science" dated February 18, 2011 No. 407-IV, as amended and supplemented on July 4, 2018.

State mandatory standard of higher and postgraduate education. Approved by the resolution of the Government of the Republic of Kazakhstan №604 from 31st October 2018

Order of the Minister of education and science of the Republic of Kazakhstan dated April 20, $2011 \text{ N}_{2} 152$ "on approval of the Rules of the educational process on credit technology" with amendments dated October 12, 2018.

Classifier of directions of personnel training with higher and postgraduate education № 569 13.10.2018.

Model Regulations of activity of educational organizations implementing educational programs of higher and (or) postgraduate education, MES RK from October 30th, 2018 # 595;

State mandatory standard of higher and postgraduate education. Approved by the resolution of the Government of the Republic of Kazakhstan №182 from 05.05.2020

Website SPA Atameken http://atameken.kz/

1.	Passport of	the educational	program
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Code and classification of the field of	8D08 Agriculture and bioresources
education	
Code and classification of training areas	8D087 Agro Engineering
Code and name of educational program	«8D08701 - Agricultural Machinery and Technology»
Type of educational program	acting
The purpose of the educational program	Fundamental, methodological and research training of
	doctors of Philosophy (PhD) in agricultural
	engineering and technology.
Level according to (ISCE)	8
Level according to NQF	8
Level according to SQF	8
The number of applications for licenses for	KZ42LAA00006720
the training	27 Mart 2019
The period of validity of accreditation	KAZSEE
	23.12.2020-22.12.2025
Degree awarded	Doctor of Philosophy by the educational program
	«8D08701 - Agricultural Machinery and Technology»
Learning outcome	Table 2
List of qualifications and positions	Production, management, teaching, research,
	experimental, design, project in various sectors of
	agriculture, teaching and research activities in the
	system of higher and postgraduate education and
	research.
Professional field of activity	Doctor of Philosophy (PhD) under the educational
	program 8D08701-Agricultural machinery and
	technology can perform professional activities in
	scientific and pedagogical; research; design and
	engineering, as well as in all branches of the Agro-
	industrial complex of the republic.
Field and object of professional activity	The objects of professional activity of graduates are:
	Doctors profile - industry institutes, expert, scientific-
	industrial and design companies, machine-building and
	repair plants, production plants for the exploitation of
	agricultural machinery.
	Doctors in scientific and pedagogical direction-state
	bodies in the field of agriculture, organizations of
	higher and special education, research institutes,
	research and production and design institutions,
	bureaus, firms and enterprises of various forms of
	ownership.
Functions of professional activity	To apply the received theoretical knowledge and
	practical skills in conducting independent basic and
	applied research; to formulate and solve problems
	arising in the course of professional, research and
	educational activities that require in-depth professional
	knowledge; to select needed methods of study, to
	modify existing and to develop new methods, based on
	the objectives of a specific study; processing the
	obtained results, analyze and interpret them based on
	the available literary data; to present results of the
	work done in the form of reports, essays, articles,
	designed in accordance and available requirements,

	with attraction of modern editing tools and press; communicate their knowledge and achievements to colleagues and the scientific community; to contribute their own original solutions, research, expanding the scientific field; navigate the latest achievements of agricultural engineering and technology.
Types of professional activity	Doctors of scientific and pedagogical direction can
	and pedagogical: research: design in all areas of
	agriculture; production and technical; organizational
	and managerial.
Be competent:	In scientific theoretical and experimental studies; in the preparation and implementation of comprehensive research projects; in the preparation and implementation of gosudarstvennyh educational standards, educational and promising curricula for bachelor, master and doctoral studies on a speciality "Agrarian equipment and technologies"; in matters of scientific methodology, the use of modern programmnyh products, processing of the obtained results and forms of their presentation; in the field of social and economic policy, Economics and management of public institutions, organizations and enterprises in the field of the agrarian sector; in organizing, planning, conducting all types of professional activity, concerning agricultural machinery and technology.

2. Learning outcomes for EP

Codes	Learning outcome
LO1	To describe the principles, methods, technologies for ensuring unanimity regarding the
	mission, strategic goals of the organization among all interested groups and modern
	problems of science and production in agroengineering and the search for their solutions,
	innovative solutions in the engineering and technical field of the agro-industrial complex,
	models for describing and predicting various phenomena.
LO2	Predict the development of events. Classify scientific and private scientific methods,
	modern methodology of scientific research and teaching, methods of systematization of
LOO	scientific knowledge.
LO3	To distinguish the main stages of the development of the evolution of technical and
	agricultural science; the subject, ideological and methodological specifics of technical and
	agricultural science; scientific schools of technical and agricultural science; scientific
	To organize the development and implementation of an industry development strategy. To
L04	rouida agricultural enterprises lacking electricity and other types of energy using
	renewable energy sources both in the world and in Kazakhstan
1.05	Apply methods for planning and implementing the processes of scientific research
LOJ	analysis evaluation and comparison of various theoretical concents in the field of
	agroengineering and draw conclusions, analyze and process information from various
	sources. To organize monitoring and evaluation of the industry's activities
LO6	To practice the development of ways to manage innovative projects of production
200	processes in animal husbandry and crop production, as well as fundamental scientific and
	methodological problems of forecasting, planning and intensification of agricultural
	production. Lead a senior management team.
LO7	To evaluate the effectiveness of individual procedures and mechanisms for the
	implementation of scientific developments in practice, the norms of interaction in the
	scientific community, the quality and effectiveness of selected scientific methods.
LO8	To defend their point of view, having a sufficient level of public speaking and public
	speaking at international scientific forums, conferences, seminars, scientific etiquette in
	discussions, discussions, in communication with colleagues, the basics of scientific
	writing and scientific competence. Evaluate plans, projects, the situation, and the results of
	activities.
LO9	Develop mechanisms for the implementation of scientific developments in practice, the
	norms of interaction in the scientific community.
LO10	Plan the quality and effectiveness of the selected scientific methods, scientific events,
	fundamental scientific domestic and international projects, new ways of research, new
	techniques. To defend one's own position, taking into account the opinion of opponents
	with an assessment of the situation and performance.

3. The content of the educational program

N⁰					Volume of credits					Distribution of credits by									
	Sec	D' ' I'	Name of the	credits	ours	Auditoriums			Extracurricul ar		1 course		2 course		3 course		its	sson 2	ontrol
	Disciplin discipline, eCode forming competencies	inacademic	inacademicho	Lectures	Practice	Laboratoryclas ses	Other (practice)	IWSL	1 semester	2 c semester	1 semester	2 semester	1 semester	2 semester	Credi	Type of le	Form of c		
	BS		Cycle of basic subjects	10	300	15	85		75	225									
			Module 1. Research scientific methods in agricultural machinery and technology																
1	UC	RSM 8101	Research scientific methods	5	150	15	35		25	75	5						7	2	exam
2	UC	AL 8102	Academic letter	5	150		50		25	75	5						18	3	exam
	AS		Cycle of advanced subjects	15	450	45	105		75	225									
			Education	al tra	jectory	չ №1 "Te	echniqu	ie and t	technol	ogy in ar	nimal	husba	andry	»	-	-		-	
		Module 2. Forecasting of scientific and technical development and selection of a system of agricultural machinery		15	450	45	105		75	225									
3	EC	FSTDChS AMMC 8304	Forecasting of scientific and technical development and the choice of a system of agricultural	5	150	15	35		25	75	5						7	2	exam

		machinery in modern conditions																	
		Module 3. Renewable energy sources and scientific problems of production in animal		10	450	45	105		75	225	10								
4	EC	RESAH 8305	Renewable energy sources in animal husbandry	5	150	15	35		25	75		5	5				7	2	exam
5		MSPPAH Modern scientific CP8305 problems of production in animal husbandry and crop production		5	150	15	35		25	75		5					7	2	exam
Educatio			nal tra	ijectory	<u>N</u> •2 "T	echniq	ue and	techno	logy in	crop	produ	iction	»	1	1		1	1	
		Module 4. Management of		10	450	45	105		75	225									
		innovative projects in animal																	
		husbandry	and crop production																
6	EC	MIPAH 8306	Management of innovative projects in animal husbandry	5	150	15	35		25	75	5						7	2	exam
7	EC	MIPCP 8306	Management of innovative projects in crop production	5	150	15	35		25	75	5						7	2	Exam
8		TP 8401	Teaching practice	10	90			90				3					10	9	dif.credit
9		RP 8402	Research practice	10	150			150				5					7	9	dif.credit
10		RWDS	Research work of a	123	3450			3450			5	10	30	30	30	18	7	9	dif.credit
			doctoral student																
			Final Attestation	12	360			360											
11			Writing and	12	360			360								12	7		
			defending of a doctoral thesis																
			Total	180	5400	45	105	4050	225	675	30	30	30	30	30	30			

¹ Note:

Department number	The name of the department							
1	Agronomy, breeding and biotechnology							
2	Soil science, agrochemistry and ecology							
3	Fruit and vegetable growing, plant protection and quarantine							
4	Forest resources, hunting and fisheries							
5	Land resources and cadastre							
6	Water resources and land reclamation							
7	Agricultural machinery and mechanical engineering							
8	"Machine use" named after I.V.Sakharov							
9	Energy saving and automation							
10	IT technologies and automation							
11	Obstetrics, surgery and reproduction biotechnology							
12	Biological safety							
13	Clinical Veterinary medicine							
14	Microbiology, Virology and Immunology							
15	Veterinary sanitary examination and hygiene							
16	"Physiology, morphology and biochemistry" named after N.U.Bazanova							
17	Accounting, audit and finance							
18	«Management and organization of agribusiness» named after Kh.D. Churin							
19	Law							
20	Zooengineering							
21	Technology and food safety							
22	Social disciplines							
23	Kazakh and Russian languages							
24	Foreign languages							
25	Physical education and sports							
26	Military Department							

4.Map of competence

Codes	Competence	Learning outcomes	Learning
			outcomes
MC1	Module 1. Research	The ability to evaluate the effectiveness of	LO1, LO2, LO5,
	scientific methods in	scientific and technical developments,	LO7, LO8
	agricultural machinery	the degree of their suitability for	
	and technology	implementation in the activities of	
		agricultural and agricultural organizations.	
MC2	Module 2. Forecasting	Be competent in forecasting scientific and	LO2, LO3,
	of scientific and	technological progress, the main directions	LO10
	technical development	of development and intensification of	
	and selection of a	production.	
	system of agricultural		
	machinery		
MC3	Module 3. Renewable	To organize the development and	LO1, LO4,
	energy sources and	implementation of an industry development	LO7, LO10
	scientific problems of	strategy. To provide agricultural enterprises	
	production in animal	lacking electricity and other types of energy	
	husbandry and crop	using renewable energy sources both in the	
	production	world and in Kazakhstan.	
MC4	Module 4.	To practice the development of ways to	LO5, LO6, LO8,
	Management of	manage innovative projects of production	
	innovative projects in	processes in animal husbandry and crop	
	animal husbandry and	production, as well as fundamental scientific	
	crop production	and methodological problems of forecasting,	
		planning and intensification of agricultural	
		production.	

5.	Summary table, reflecting the amount of credits disbursed in the context of the modules of
	the educational program:

							r					
		The nu	mber of		The nur	nher of s		Nun	nber			
		disci	plines		The number of academic credits							
Training course	Semester.	UC	EC	Theoretical training	Pedagogical practice	Research practice	Scientific Research of a doctoral student	Final attestation	Total	Total hours	Exam	Dif. exam
Ι	1	2	3	25			5		30	1200	5	1
	2	-			10	10	10		30	990		3
Π	3	-	_				30		30	480		1
	4	-	-				30		30	870		1
III	5	-	-				30		30	510		1
	6	-	-				18	12	30	1350		1
Tot	tal	2	3	25	10	10	123	12	180	5400	5	8

Information about disciplines

disciplinedisciplinecreditscompetencies (codes)1Researchscientific"Methods of scientific research" - to introduce doctoral students to the methodological foundations of scientific knowledge; methods of theoretical and experimental research in various fields; general issues of modeling in scientific research, issues of searching, processing and systematization of scientific and technical information, as well as registration of research results in the form of scientific reports, articles and presentations. The discipline considers the methodology of research of technological processes, the study of their patterns, the development and use of pedagogical skills. The discipline gives an idea of the essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific research to technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific research to technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific research that determines the methodology	N⁰	Name of the	Short description of the	Number of	Formed
Image: Control of the second		discipline	discipline	credits	competencies
Cycle of basic subjects / University component 1 Research methods scientific scientific "Methods of scientific research" - to introduce doctoral students to the methodological foundations of scientific knowledge; methods of theoretical and experimental research in various fields; general issues of modeling in scientific research, issues of searching, processing and systematization of scientific and technical information, as well as registration of research results in the form of scientific reports, articles and presentations. The discipline considers the methodology of research of technological processes, the study of their patterns, the development and use of pedagogical skills. The discipline gives an idea of the essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific research that determines the methodology of scientific work. 5 LO1, LO 2, LO8, LO 9 2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO 9		-	_		(codes)
1 Research scientific methods of scientific research" - to introduce doctoral students to the methodological foundations of scientific knowledge; methods of theoretical and experimental research in various fields; general issues of modeling in scientific research, issues of searching, processing and systematization of scientific research in the form of scientific reports, articles and presentations. The discipline considers the methodology of their patterns, the development and use of pedagogical skills. The discipline gives an idea of the essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific work. 5 LO1, LO 2, LO5, LO7 2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific research text scientific 5 LO1, LO 2, LO8, LO 9		С	ycle of basic subjects / University of	component	
methods to introduce doctoral students to the methodological foundations of scientific knowledge; methods of theoretical and experimental research in various fields; general issues of modeling in scientific research, issues of searching, processing and systematization of scientific and technical information, as well as registration of research results in the form of scientific reports, articles and presentations. The discipline considers the methodology of research of technological processes, the study of their patterns, the development and use of pedagogical skills. The discipline gives an idea of the essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific research that determines the methodology of scientific research that determines the methodology of scientific work. 5 LO1, LO 2, LO8, LO 9 2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO 9	1	Research scientific	"Methods of scientific research" -	5	LO1, LO 2, LO5,
2 Academic letter This course forms the skills of doctral students to create written and oral academic texts, correct compliation of bibliographic 5 LO1, LO 2, LO8, LO 9		methods	to introduce doctoral students to		LO7
2 Academic letter Scientific knowledge; methods of theoretical and experimental research, insues of searching, processing and systematization of scientific research, issues of searching, processing and systematization of scientific research results in the form of scientific reports, articles and presentations. The discipline considers the methodology of research of technological processes, the study of their patterns, the development and use of pedagogical skills. The discipline gives an idea of the essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific work. 2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO 9			the methodological foundations of		
2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compulation of bibliographic 5 L01, L02, L08, L09			scientific knowledge; methods of		
2 Academic letter This course forms the skills of descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO9			theoretical and experimental		
2 Academic letter This course forms the skills of descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO 9			research in various fields; general		
2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic 5 LO1, LO 2, LO8, LO 9			issues of modeling in scientific		
2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compulation of the bibliographic descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO 9			research, issues of searching,		
2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific 5 L01, L02, L08, L09			processing and systematization of		
2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic 5 LO1, LO 2, LO8, LO 9			scientific and technical		
2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO 9			information, as well as		
2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO 9			registration of research results in		
2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			the form of scientific reports,		
2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			articles and presentations. The		
2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			discipline considers the		
2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct communication in the scientific5LO1, LO 2, LO8, LO 9			methodology of research of		
2Academic letterof their patterns, the development and use of pedagogical skills. The discipline gives an idea of the essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific work.2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			technological processes, the study		
and use of pedagogical skills. The discipline gives an idea of the essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific work. 2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific 5 LO1, LO 2, LO8, LO 9			of their patterns, the development		
discipline gives an idea of the essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific work.2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			and use of pedagogical skills. The		
essence and importance of modern technologies in education, as well as the empirical, theoretical level of scientific research that determines the methodology of scientific work.2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			discipline gives an idea of the		
2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			essence and importance of		
as well as the empirical, theoretical level of scientific research that determines the methodology of scientific work.2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			modern technologies in education,		
theoretical level of scientific research that determines the methodology of scientific work.LO1, LO 2, LO8,2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8,			as well as the empirical,		
research that determines the methodology of scientific work.LO1, LO 2, LO8,2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			theoretical level of scientific		
methodology of scientific work.2Academic letterThis course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific5LO1, LO 2, LO8, LO 9			research that determines the		
2 Academic letter This course forms the skills of doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific			methodology of scientific work.		
doctoral students to create written and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientificLO 9	2	Academic letter	This course forms the skills of	5	LO1, LO 2, LO8,
and oral academic texts, correct compilation of bibliographic descriptions, and principles of communication in the scientific			doctoral students to create written		LO 9
compilation of bibliographic descriptions, and principles of communication in the scientific			and oral academic texts, correct		
descriptions, and principles of communication in the scientific			compilation of bibliographic		
communication in the scientific			descriptions, and principles of		
			communication in the scientific		
environment. The discipline deals			environment. The discipline deals		
with scientific discourse, citation			with scientific discourse, citation		
rules and plagiarism, information			rules and plagiarism, information		
databases and data sets,			databases and data sets,		
international databases of			international databases of		
scientific citation (web of			scientific citation (web of		
Science, SCOPUS), and the			Science, SCOPUS), and the		
database (PSCI)			Autobase (PSCI)		
Cycle of advanced subjects / Fleetive component			vala of advanced subjects / Fleative	component	
3 Forecasting of The study of the discipline gives 5 IO2	3	Eorecasting of	The study of the discipline gives	5	102
scientific and technical doctoral students the formation of		scientific and technical	doctoral students the formation of	5	
development and the a knowledge system for solving		development and the	a knowledge system for solving		
choice of a system of professional tasks on predicting		choice of a system of	professional tasks on predicting		
agricultural machinery the reliability of machines		agricultural machinerv	the reliability of machines		

	in modern conditions	operated in the agro-industrial complex, improving the operational reliability of machines. The discipline examines the fundamental scientific and methodological problems of forecasting, planning and intensification of agricultural production. For the agro-industrial complex, technologies and a system of machines for the intensification of production processes are considered, as well as types of agricultural production with different forms of ownership, including the definition of basic production indicators.		
4	Renewable energy sources in animal husbandry	The study of the discipline by doctoral students forms a system of competencies for the assimilation of processes, machines and equipment based on non-traditional energy sources. The discipline shows the relevance of the use of renewable energy sources both in the world and in Kazakhstan, examines the structure and dynamics of global energy consumption growth. The increase in prices for thermal and electric energy, and for other various energy carriers is given. It also provides for measures to save energy and improve the environment, the impact of extraction, processing, transportation and combustion of organic fuels on the environment	5	LO 1, LO 4, LO 7
5	Modern scientific problems of production in animal husbandry and crop production	The purpose of the discipline is to form a system of professional knowledge, skills and abilities among doctoral students on methods and means of resource conservation in the production of crop and livestock products. The discipline considers the formation of students' ideas about priority areas of development in animal husbandry and crop production, as well as modern production technologies. This discipline involves solving scientific problems in the agro-industrial complex, which makes it possible	5	LO 1, LO 4, LO 10

		to widely use various scientific		
		world achievements.		
6	Management of	Studying the discipline, doctoral	5	LO 5,
	innovative projects in	students develop skills to gain		LO 6, LO 8
	animal husbandry	knowledge in the field of research		
		work in the technological		
		processes of production and		
		processing of livestock products.		
		Knowledge of methods,		
		techniques and technology of		
		project management in animal		
		husbandry, the development of		
		advanced techniques for		
		developing and making		
		management decisions, the		
		methodology of scientific		
		solutions to problematic issues in		
		technology and technical means.		
		The discipline provides basic		
		concepts and definitions in the		
		field of project management.		
		classification of projects in animal		
		husbandry, life cycle and project		
		management. The functions and		
		organizational structures of		
		human resource management,		
		including international		
		institutions, are considered.		
7	Management of	The study of the discipline gives	5	LO 5, LO 6,
	innovative projects in	an idea of modern project		LO 8
	crop production	management technology in crop		
		production, to acquaint doctoral		
		students with the principles of		
		using project management, to		
		develop basic project management		
		skills in crop production. The		
		discipline provides basic concepts		
		and definitions in the field of		
		project management,		
		classification of projects in crop		
		production, life cycle and project		
		management. The functions and		
		organizational structures of		
		human resource management,		
		including international		
		institutions, are considered.		

Practice bases

N⁰	Name of companies, enterprises, organizations	Contacts Phone, e-mail
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