

**MINISTRY OF AGRICULTURE OF THE REPUBLIC OF KAZAKHSTAN  
S.SEIFULLIN KAZAKH AGROTECHNICAL UNIVERSITY**

**Considered**

at the meeting of the  
Academic Council  
S. Seifullin KazATU  
Minutes № 19  
31.08 2022

**«Confirm»**

Chairman of the Board  
NJSC "S. Seifullin Kazakh  
agrotechnical university"

« 31 » 08 2022



**EDUCATIONAL PROGRAM**

**7M08202 «Selection and reproduction of agricultural animals»**

Code and classification of the field of education: 7M08 Agriculture and bioresources

Code and classification of direction of personnel training: 7M082 - Animal production

Code in the International Standard Classification of Education: 7M0811

Degree/qualification awarded: Master in Agricultural Sciences of EP «Selection and reproduction of agricultural animals»

Period of study: 2 years

The author's team:

1. Full name - academic degree, title, position, place of work

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The team of authors was approved by the order of the AO "S. Seifullin KATU" № 932 H from 12.12.2018 (order with changes № 517-H from 4.10.2022).

Educational program 7M08202 "Selection and reproduction of agricultural animals" considered at the meeting of the department "Technology of production and processing of livestock products"

Minutes № 1 of 27.08., 2022

approved by the "Veterinary and animal husbandry technology" Faculty Council

Minutes № 10 of 27.08., 2022

## The content of the educational program

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## **1 Passport of the educational program**

### **1.1 Purpose of the educational program**

High-quality training of masters of agricultural sciences with in-depth training in breeding and reproduction issues to implement the basic principles and methods for improving the productive and breeding qualities of farm animals and birds, to improve the techniques and methods of breeding work, genomic selection, who have the skills to purposefully influence qualitative and quantitative indicators livestock industries.

### **1.2 The formed educational outcomes**

**ON 1.** To demonstrate developing knowledge and understanding to manage both pedagogical activity and professional branch, foreign language proficiency at a professional level, allowing to conduct research; ability to demonstrate knowledge of functional and stylistic characteristics general scientific terminology and terminology sublanguage of the relevant specialty in a foreign language.

**ON 2.** To apply at the professional level their knowledge, understanding of actual problems of history and philosophy of science as a modern world tradition of philosophical understanding of the nature of science methodology of scientific knowledge, the formation of scientific and methodological worldview based on knowledge of the features of modern science, improving the skills of scientific understanding of reality.

**ON 3.** To apply at the professional level their knowledge, understanding of the principles and structure of the organization of scientific and pedagogical activity; readiness for use of psychological and pedagogical methods and means of increase of efficiency of training and education, modern technologies in professionalization of pedagogical shots in the field of animal husbandry.

**ON 4.** To collect and interpret information of laws of development of psychology of management; functional structure of administrative activity, psychological methods of management, psychological aspects of decision-making and administrative interaction, selection, arrangement and object of management, psychology of criticism, psychotypes of subjects of communication, psychological technique of persuasive influence.

**ON 5.** To use the training skills necessary for independent continuation of the foundations of morphological and functional analysis, differential equations, discrete mathematics and probability theory, mathematical statistics and theory of random processes, numerical methods and programs of the statistical observation of the activities of the industry; the willingness of the mathematical model, interpretation of the obtained solution, the use of application software packages for solving problems arising in the course of research activities.

**ON 6.** To demonstrate developing knowledge and understanding of legislative and regulatory legal acts relating to the regulation of relations in the field of livestock breeding, distinctive features of experiments on the evaluation of hereditary-constitutional factors of productivity, the history of livestock development and biometric processing of research results; readiness to use the basic methodological techniques of setting zootechnical experiments.

**ON 7.** To use the training skills necessary for independent continuation in advanced technologies of production of animal products, innovative technologies of breeding and feeding in animal husbandry, the latest achievements in the development of intensive technology of production of animal products, basic technologies in livestock industries;

the ability to organize work that contribute to the effective management of the industry in different types of livestock enterprises.

**ON 8.**To communicate clearly and unambiguously information, problems and solutions about farm animals as objects of genetic and cellular engineering, the essence of genetic and cellular engineering; willingness to use the knowledge gained in genetic manipulation of cells and the creation of transgenic organisms, mastered the skills of using methods of genetic engineering, gene identification and developing areas of genetic engineering, biochemical and molecular biological bases of genetic engineering.

**ON 9.**To apply at the professional level their knowledge, understanding programs of statistical monitoring of the industry, computer programming, information technologies in the production of livestock products, methods of their integrated assessment and effective use, the ability to maintain zootechnical accounting and entering into the database of IAS.

**ON 10.**To demonstrate developing knowledge and understanding the problems of integrated biotechnology in animal breeding and biotechnological methods for the stimulation of reproduction of dairy and beef cattle, embryo transfer, methods of freezing and thawing of embryos based on the use of new chriopractic; readiness to apply the acquired knowledge in modeling, analysis, and evaluation of biotechnological processes.

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

The educational program was developed in accordance with the National Qualifications Framework, professional Standards and approved by the SES of the Ministry of Education and Science of the Republic of Kazakhstan №604 dated October 31, 2018.

The EP includes 120 credits (3600 hours) of training, including: 62 credits (1860 hours) - theoretical training, 24 credits (720 hours) – research work and 12 credits (360 hours) - final certification. At the same time, the master's student must master the volume of the BD cycle is 35 academic credits, of which 20 academic credits are allocated to the university component, the volume of the PD cycle is 49 academic credits in the total volume of the master's educational program.

### **2.1 Relevance:**

Currently, specialists who have in-depth knowledge of the chosen specialty and possess the ability and skills of the specialty of breeding and reproduction, including animal husbandry, are in demand. Consequently, a specialist of the new formation should be trained to work in farms of various forms of ownership, where different types of livestock products are produced. In this regard, the training of specialists in the educational program is very relevant.

### **2.2 Features, competitive advantages:**

Masters of agriculture prepared according to the educational program, including animal husbandry are in demand, as in the working conditions of production enterprises for the production of livestock breeding products located in farms of various forms of ownership, located in rural areas where farm animals of different species and breeds, as well as birds, are bred. This is the features and competitive advantages of specialists studying under this educational program "Breeding and reproduction of farm animals".

### **3 Competence model (portrait) graduate**

A graduate of the EP "Selection and reproduction of agricultural animals" is a production manager who organizes breeding and breeding work in the livestock industry,

using modern approaches and methods, technologies for the production of livestock products.

### **3.1 Areas of professional activity**

The sphere of professional activity of the Master of the educational program "Selection and reproduction of agricultural animals" in direction of personnel training 7M082 – "Animal production" is the technology of production of livestock products, breeding work in farms of various forms of ownership and organization of production of livestock products, exhibitions and auctions of farm animals and birds, organization of export and import of livestock products.

### **3.2 Types of professional activity**

The types of professional activity of the Master of the educational program "Selection and reproduction of agricultural animals" of direction of personnel training 7M082 Animal production are: a) production and technological, b) organizational and managerial, c) research, d) breeding and breeding work.

### **3.3 General education competencies**

Learning outcomes are formulated at level of master's entire educational program and individual level modules or discipline.

Descriptors shall reflect learning outcomes that characterize learner's abilities:

1) to demonstrate developing knowledge, understanding studied area, based on advanced knowledge, ideas development and / or application in study context;

2) to apply professional level knowledge, understanding, abilities to solve problems in new environment, wider interdisciplinary context;

3) to collect, interpret information form judgments taking into account social, ethical considerations;

4) to clearly, unambiguously communicate information, ideas, problems, solutions, both specialists, non-specialists;

5) training skills necessary for education independent continuation in area.

### **3.4 Basic competencies**

Upon completion of the study of the basic disciplines of the BD cycle, undergraduates must: be competent in modern educational technologies; apply the knowledge of pedagogy and psychology of higher education in their teaching activities; apply interactive teaching methods; Be fluent in a foreign language at a professional level, allowing for scientific research and teaching of special disciplines in universities; to consider the main laws and legislative acts on livestock breeding, the principles of the formation of regulatory support for livestock breeding in the Republic of Kazakhstan; to be able to form solutions based on research problems by integrating knowledge from new or interdisciplinary fields; to lead a group of employees taking responsibility for the result of their actions at a specific site of the technological process.

### **3.5 Professional competencies**

Upon completion of the study of the basic disciplines of the PD cycle, undergraduates should: apply practical and cognitive skills in strategic planning, job evaluation, situation analysis; creatively develop and put forward various solutions, including alternative solutions, when compiling annual reports; have comprehensive knowledge of the methodology of system analysis and design of professional situations; be competent in the field of methodology of scientific research and in the implementation of scientific projects and research in the professional field of animal husbandry; to use the

acquired knowledge for the original development and application of ideas in the context of scientific research; to have the ability to apply modern methods and techniques of breeding, breeding and effective use of animals and birds; to determine the breeding and productive qualities of farm animals; methods of marketing research and information.

#### 4 The base of passing professional practices

The basis for passing professional practices of the EP:

1) Research practice: "AgrofirmaRodina" LLP, "Astana Onim" JSC, "Capital Projekts LTD" LLP, "Zhaksybay Agro" LLP, SKO, "Baysyerke Agro" LLP, Almaty region, "Aina" dairy farm, "Kamyshenka" LLP, "Izhevsky" LLP, "SK Food" LLP, "AKA" LLP, "Astana kus" LLP, Akmola region, "KazBeef" LLP, Karaganda region and all agricultural enterprises of different ownership in Akmola, Karaganda, North Kazakhstan regions.

2) Pedagogical practice: S.SeifullinKazakh agrotechnical university and on the basis of other universitie

#### 5 Structure of the Master's degree program

№	Name of cycles and disciplines	Total labor intensity	
		In academic hours	In academic credits
1	2	3	4
1.	<b>Theoretical learning</b>	<b>1860</b>	<b>62</b>
1	<b>Cycle of basic disciplines (BD)</b>	<b>1050</b>	<b>35</b>
1)	<b>University component</b>	<b>600</b>	<b>20</b>
	History and philosophy of science	150	5
	Foreign language (professional)	150	5
	Pedagogics of higher school	90	3
	Psychology of management	150	5
	Pedagogical practice	60	2
2)	<b>Component of choice</b>	<b>450</b>	<b>15</b>
	English for Academic Purposes/ Foreign language for academic purposes	150	5
	Mathematical modeling in animal husbandry/ Planning and modeling of the breeding process in animal husbandry	150	5
	Fundamentals of scientific research/ Methodology of scientific research and analysis of zootechnical experiments	150	5
2	<b>Cycle of profile disciplines (PD)</b>	<b>1470</b>	<b>49</b>
1)	<b>University component</b>	<b>630</b>	<b>21</b>
	Technological innovation of livestock products	240	8
	Genetic engineering	120	4

	Methods of animals genetic evaluation and selection-breeding work	150	5
	Statistical analyzes in animal husbandry	120	4
	<b>Research practice</b>	<b>600</b>	<b>20</b>
	<b>Component of choice</b>	<b>240</b>	<b>8</b>
2)	Information technologies in livestock/ Digital animal husbandry	120	4
	Integrated biotechnology in animal husbandry/ Molecular genetic basics of biotechnology	120	4
3)	Research practice	600	20
3	<b>Researchwork</b>	<b>720</b>	<b>24</b>
1)	Master student's research work, including implementation of master's thesis	720	24
4	<b>Final attestation</b>	<b>360</b>	<b>12</b>
	Preparation and defense of a master's thesis (ОиЗМД)	360	12
	<b>Total</b>	<b>3600</b>	<b>120</b>



## Appendix 1. Academic Calendar

**Confirmed**

Acting Chairman of the Academic Council  
NAO 'S.Seifullin KATU'

E.N.Nysanbayev

2022

**ACADEMIC CALENDAR**  
for 2022-2023 academic year  
in areas of Master's training

<b>Beginning of 1st trimester</b>		<b>1 September</b>
1	Presentation week	from 1 September to September 2 (from August 29 to September 2 for 1 course)
2	<i>Constitution day</i>	<i>30 August</i>
3	<i>The day of knowledge</i>	<i>1 September</i>
4	Examination session	from 14 to 25 November
5	<i>The day of the First President</i>	<i>of 1 December</i>
6	FX delivery	from 14 November to 9 December
7	<i>Independence day</i>	<i>16 December</i>
8	Holidays	from 28 November to 31 December
9	<i>The New year's holiday</i>	<i>January 1,2,3</i>
<b>Beginning of 2nd trimester</b>		<b>1 January</b>
10	<i>Christmas</i>	<i>7 January</i>
11	<i>International Women's Day</i>	<i>on 8 March</i>
12	<i>Nauryz holiday</i>	<i>21,22,23 March</i>
13	Examination session	from March 13 to 24 March
14	FX delivery	from March 13 to 31 March
15	Holidays	from March 27 to March 31
<b>Beginning of 3rd trimester</b>		<b>1 April</b>
16	<i>Holiday of Unity of Nations of Kazakhstan</i>	<i>1 May</i>
17	<i>Defender is day</i>	<i>7 may</i>
18	<i>Victory Day</i>	<i>9 may</i>
19	Examination session	from 12 June to 23 June
20	Holidays	from 26 June to 31 August
21	FX delivery	from 12 June to 30 June
22	Enrollment for a trimester	from 26 June to 30 June
23	Final examination	until June 30
24	Summer trimester	from 3 June to 11 August
25	<i>Capital Day</i>	<i>6 July</i>

Approved by the Academic Council of the NAO 'S.Seifullin KATU',  
Protocol No. 14 of 13.05 2022.

☑ **Note:** If it concurs with a weekend or a holiday, study begins on the next workin day.

Appendix 1 to the Academic Calendar

Approved by the Academic Council of the NAO "S.Seifullin KATU", Protocol No 14 of 13.05.2022

Schedule of the educational process for the 2022-2023 academic year for the Master's degree program of the Faculty of Veterinary and Animal Husbandry Technology

2022-2023 academic year																																																																											
K type	September					October					November					December				January				February				March				April				May				June				July				August																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52																							
	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	1																
7M091 EP "Veterinary" diagnostics, treatment and prevention of animal diseases, direction: scientific and pedagogical																																																																											
I	PW	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	.	.	.	TP	TP	TP	TP	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	RP	RP	RP	RP	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	RD/DFx/H	So/H	So/H	So/H	So/H	So/H	So/H	So/H	H	H	H	H	H																							
II	RP	RP	RP	RP	RP	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	RP	RP	RP	RP	RP	RP	RP	RP	RP	SRWM	SRWM	H	SRWM	SRWM	SRWM	SRWM	SRWM	SRWM	SRWM	SRWM	SET	SET	SET	SET	SET	SET	SET																															
7M091 EP "Veterinary" diagnostics, treatment and prevention of animal diseases, direction: scientific and pedagogical WINTER																																																																											
II win	H	H	.	.	.	.	TP	TP	TP	TP	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	.	.	.	.	RP	RP	RP	RP	RP	RP	.	.	.	.	E <sub>s</sub> /DFx	H	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	SRWM	SRWM	RD/DFx/H	So/H	So/H	So/H	So/H	So/H	So/H	H	H	H	H	H												
7M091 EP "Food safety and quality", direction: scientific and pedagogical																																																																											
I	PW	.	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	.	.	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	RP	RP	RP	RP	RP	RP	RP	RP	TP	TP	TP	TP	TP	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	RD/DFx/H	So/H	So/H	So/H	So/H	So/H	So/H	So/H	H	H	H	H	H																	
II	RP	RP	RP	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	RP	RP	RP	RP	RP	RP	RP	RP	RP	SRWM	SRWM	H	SRWM	SRWM	SRWM	SRWM	SRWM	SRWM	SRWM	SET	SET	SET	SET	SET	SET	SET	SET																															
7M082 "Animal breeding" for the education program "Selection and reproduction of agricultural animals" and for the education program "Feed and feeding of farm animals", Master's program by specialization (Scientific & pedagogical direction)																																																																											
I	PW	.	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	.	.	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	RP	RP	RP	RP	RP	RP	RP	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	RD/DFx/H	So/H	So/H	So/H	So/H	So/H	So/H	So/H	So/H	H	H	H	H	H																	
II	H	H	.	.	.	TP	TP	TP	TP	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	RP	RP	RP	RP	RP	RP	RP	RP	RP	SRWM	SRWM	H	SRWM	SRWM	SRWM	SRWM	SRWM	SRWM	SET	SET	SET	SET	SET	SET	SET																														
7M082 "Animal breeding" for the education program "Selection and reproduction of agricultural animals" (winter)																																																																											
II win	H	H	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	.	.	.	RP	RP	RP	RP	RP	TP	TP	TP	TP	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP		
7M082 OP "Veterinary biotechnology", direction: scientific and pedagogical																																																																											
I	PW	.	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	.	.	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	RP	RP	RP	RP	RP	RP	RP	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	RD/DFx/H	So/H	So/H	So/H	So/H	So/H	So/H	So/H	So/H	H	H	H	H	H																	
II	RP	RP	RP	RP	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	DFx/H	H	H	H	.	.	.	.	.	.	.	.	.	.	E <sub>s</sub> /DFx	E <sub>s</sub> /DFx	DFx/H	SRWM	SRWM	SRWM	SRWM	SRWM	SRWM	SRWM	SET	SET	SET	SET	SET	SET	SET	SET																														

- PW - presentation week
- . - theoretical training
- E<sub>s</sub> - examination session
- So - summer trimester
- RP - research practice

- TP - teaching practice
- SRWM - scientific and research work of Master student
- RD - Registration for discipline
- DFx - delivery of FX

- H - holidays
- SET - state exams and thesis defense

## Appendix 2. Working curriculum

WORKING CURRICULUM																												
For the modular education program "Selection and reproduction of agricultural animals"																												
Field of education 7M08 – Agriculture and biosources																												
Direction of training 7M082 –																												
In speciality M132 – Animal breeding																												
Course years 2022-2024																												
Degree : Master's program by specialization (Scientific & pedagogical direction)																												
Form of education: Full-time (MS 2 years) trimester																												
Entry year : 25-05-2022																												
Module code	Module name	Discipline code	Discipline	Code of subject	Subject name	Academic credits	Control in the academic period					Volume of hours					Distribution of credits per academic period											
							Exams	Differentiated test/practical	Differentiated test (course paper)	Practice/SRW	Total	In-class learning	including			Self-study work of Ms	Self-study work of Ms	Number of weeks in the academic period										
													Lectures	Practical	Lab practicals			1 course		2 course								
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10								
General modules																												
1	Social sciences	BS	U	IFN 5203	History and philosophy of science	5	2				150.0	50.0	1/20	2/30		1/20	5/80	5.0										
2		BS	U	PVSH 5204	Pedagogics of higher school	3	2				90.0	30.0	0/10	1/20		0/12	3/48	3.0										
3		BS	U	PU 5205	Psychology of management	5	2				150.0	50.0	1/20	2/30		1/20	5/80	5.0										
4	Professional foreign	BS	U	IYaP 5201	Foreign language (professional)	5	2				150.0	50.0		3/50		1/20	5/80	5.0										
5		BS	E	IYaDAC 5215	Foreign language for academic purposes	5	3				150.0	50.0		3/50		1/20	5/80			5.0								
6		BS	E	AYaDAC 5211	English for Academic Purposes	5	3				150.0	50.0		3/50		1/20	5/80			5.0								
Modules of specialty/education program																												
7	Genetic assessment and scientific and static processes	AS	U	MGOZhSPR	Methods of animals genetic evaluation and selection-breeding work	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0										
8		AS	U	SAZh 5303	Statistical analyzes in animal husbandry	4	3				120.0	40.0	1/20	1/20		1/16	4/64			4.0								
9		AS	U	GI 6304	Genetic engineering	4	4				120.0	40.0	1/20	1/20		1/16	4/64				4.0							
10	scientific and static processes	AS	E	IBZh 5305	Integrated biotechnology in animal husbandry	4	3				120.0	40.0	1/20	1/20		1/16	4/64			4.0								
11		AS	E	MGOB 5308	Molecular genetic basics of biotechnology	4	3				120.0	40.0	1/20	1/20		1/16	4/64			4.0								
12		BS	E	MMZh 5210	Mathematical modeling in animal husbandry	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0										
13	Innovative technology	BS	E	MNIAZE 5217	Methodology of scientific research and analysis of zootechnical	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0										
14		BS	E	NOMI 5209	Fundamentals of scientific research	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0										
15		BS	E	PMSPZh 5216	Planning and modeling of the breeding process in animal husbandry	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0										
16	Innovative technology	AS	U	ITPPZh 5302	Technological innovation of livestock products	8	1				120.0	40.0	1/20	1/20		1/16	4/64	8.0										
17		AS	E	ITZh 6306	Information technologies in livestock	4	4				120.0	40.0	1/20	1/20		1/16	4/64				4.0							
18		AS	E	CZh 6310	Digital animal husbandry	4	4				120.0	40.0	1/20	1/20		1/16	4/64				4.0							
Scientifically research																												
19	The research work of a master student.	RW	C	NIRMVMD	Master student's research work, including implementation of master's thesis	1					30.0									1.0								
20		RW	C	NIRMVMD	Master student's research work, including implementation of master's thesis	1					30.0										1.0							
21		RW	C	NIRMVMD	Master student's research work, including implementation of master's thesis	1					30.0											1.0						
22		RW	C	NIRMVMD	Master student's research work, including implementation of master's thesis	3					90.0												3.0					
23		RW	C	NIRMVMD	Master student's research work, including implementation of master's thesis	10					300.0													10.0				
24	RW	C	NIRMVMD	Master student's research work, including implementation of master's thesis	8					240.0														8.0				
25		BS	U	PP 6202	Teaching practice	2					60.0																	
26		AS	U	IP 6309	Research practice	4					120.0																	
27		AS	U	IP 6309	Research practice	6					180.0																	
28		AS	U	IP 6309	Research practice	10					300.0																	
<b>Total of theoretical course</b>						<b>85</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3910</b>	<b>810</b>	<b>290</b>	<b>520</b>	<b>0</b>	<b>324</b>	<b>1296</b>											
AC	<b>Additional courses</b>					<b>46</b>																						
PP	Teaching practice					2			4																			
RP	Research practice					20			3, 4, 5																			
MSSR	Master student's research work, including implementation of master's thesis					24																						
FA	<b>Final attestation</b>					<b>12</b>																						
	Master dissertation defence					12																						
<b>Total</b>						<b>143</b>					<b>4170</b>	<b>810</b>	<b>290</b>	<b>520</b>	<b>0</b>	<b>324</b>	<b>1296</b>											

**WORKING CURRICULUM**  
**For the modular education program "Selection and reproduction of agricultural animals"**  
 Field of education 7M08 – Agriculture and bioresources  
 Direction of training 7M082 –  
 In specialty M132 – Animal breeding  
 Course years 2021-2023  
 Degree : Master's program by specialization (Scientific & pedagogical direction)  
 Form of education: Full-time (MS 2 years) trimester  
 Entry year : 25-05-2021

Module code	Module name	Discipline cycle	Discipline	Code of subject	Subject name	Academic credits	Control in the academic period					Volume of hours					Distribution of credits per academic period														
							Exams	Differentiated test/pract	Differentiated test/course paper	Practice/S RW	Total	In-class learning	including			Self-study work of Ms	Self-study work of Ms	1 course			2 course										
													Lectures	Practice	Lab practicals			10	10	10	10	10	10								
																								Number of weeks in the academic period							
10	10	10	10	10	10																										
General modules																															
1	Social sciences	BS UC	IFN 5203	History and philosophy of science	5	2				150.0	50.0	1/20	2/30		1/20	5/80	5.0														
2		BS UC	PVSH 5204	Pedagogics of higher school	3	2				90.0	30.0	0/10	1/20		0/12	3/48	3.0														
3		BS UC	PU 5205	Psychology of management	5	2				150.0	50.0	1/20	2/30		1/20	5/80	5.0														
4		Professional	BS UC	IYaP 5201	Foreign language (professional)	5	2				150.0	50.0		3/50		1/20	5/80	5.0													
5			BS ES	AYaDAC 5211	English for Academic Purposes	4	3				120.0	40.0		2/40		1/16	4/64	4.0													
Modules of specialty/education program																															
6	Genetic assessments and scientific and innovative technologies	AS UC	MG0ZhSPR 5301	Methods of animals genetic evaluation and selection-breeding work	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0														
7		AS UC	SAZh 5303	Statistical analyzes in animal husbandry	5	3				150.0	50.0	1/20	2/30		1/20	5/80		5.0													
8		AS UC	GI 6304	Genetic engineering	4	4				120.0	40.0	1/20	1/20		1/16	4/64			4.0												
9		AS ES	IBZh 5305	Integrated biotechnology in animal husbandry	4	3				120.0	40.0	1/20	1/20		1/16	4/64			4.0												
10		BS ES	MMZh 5210	Mathematical modeling in animal husbandry	4	1				120.0	40.0	1/20	1/20		1/16	4/64	4.0														
11		BS ES	NOMI 5209	Fundamentals of scientific research	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0														
12		AS UC	ITPPZh 5302	Technological innovation of livestock products	4	1				120.0	40.0	1/20	1/20		1/16	4/64	4.0														
13		AS UC	ITPPZh 5307	Technological innovation of livestock products	4	2				120.0	40.0	1/20	1/20		1/16	4/64	4.0														
14		AS ES	ITZh 6306	Information technologies in livestock	5	4				150.0	50.0	1/20	2/30		1/20	5/80															
Scientifically research																															
15		The research work of a master student	RW CS	NIRM/VVMD 5506	Master student's research work, including implementation of master's thesis	1					30.0							1.0													
16			RW CS	NIRM/VVMD 5501	Master student's research work, including implementation of master's thesis	1					30.0									1.0											
17			RW CS	NIRM/VVMD 5502	Master student's research work, including implementation of master's thesis	1					30.0										1.0										
18			RW CS	NIRM/VVMD 6503	Master student's research work, including implementation of master's thesis	3					90.0											3.0									
19	RW CS		NIRM/VVMD 6504	Master student's research work, including implementation of master's thesis	10					300.0												10.0									
20	RW CS		NIRM/VVMD 6505	Master student's research work, including implementation of master's thesis	8					240.0																				8.0	
21		BS UC	IP 5206	Research practice	4					120.0																			4.0		
22		BS UC	PP 6202	Teaching practice	2					60.0																				2.0	
23		BS UC	IP 6207	Research practice	6					180.0																				6.0	
24		BS UC	IP 6208	Research practice	10					300.0																				10.0	
<b>Total of theoretical course</b>					62	14	0	0	0	3240	620	230	390	0	248	992															
AC	<b>Additional courses</b>				46																										
PP	Teaching practice				2		4		4																						
RP	Research practice				20		3, 4, 5		5																						
MSSRW	Master student's research work, including implementation of master's thesis				24				1, 2, 3,																						
FA	<b>Final attestation</b>				12																										
	Master dissertation defence				12				6																						
<b>Total</b>					120				6	3600	620	230	390	0	248	992															

**WORKING CURRICULUM**

For the modular education program "Selection and reproduction of agricultural animals"

Field of education 7M08 – Agriculture and bioresources

Direction of training 7M082 –

In specialty M132 – Animal breeding

Course years 2022-2024

Degree : Master's program by specialization (Scientific & pedagogical direction)

Form of education: Full-time (MS 2 years) trimester

Entry year : 05-01-2022

Module code	Module name	Discipline code	Discipline	Code of subject	Subject name	Academic credits	Control in the academic period					Volume of hours					Distribution of credits per academic period										
							Exams	Differentiated test/practical	Differentiated test (course paper)	Practice/SRW	Total	In-class learning	including			Self-study work of Ms	Self-study work of Ms	1 course			2 course						
													Lectures	Practice	Lab practicals			1	2	3	4	5	6				
													Number of weeks in the academic period														
													10	10	10	10	10	10									
<b>General modules</b>																											
1	Social sciences	BS	UC	IFN 5203	History and philosophy of science	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0									
2		BS	UC	PVSH 5204	Pedagogics of higher school	3	1				90.0	30.0	0/10	1/20		0/12	3/48	3.0									
3		BS	UC	PU 5205	Psychology of management	5	1				150.0	50.0	1/20	2/30		1/20	5/80	5.0									
4		BS	UC	YaP 5201	Foreign language (professional)	5	1				150.0	50.0		3/50		1/20	5/80	5.0									
5		BS	ES	AYaDAC 5211	English for Academic Purposes	4	2				120.0	40.0		2/40		1/16	4/64	4.0									
<b>Modules of specialty/education program</b>																											
6	Genetic assessments and scientific and innovative technologies	AS	UC	MG0ZhSPR	Methods of animals genetic evaluation and selection-breeding work	5	2				150.0	50.0	1/20	2/30		1/20	5/80	5.0									
7		AS	UC	SAZh 5303	Statistical analyzes in animal husbandry	5	3				150.0	50.0	1/20	2/30		1/20	5/80	5.0									
8		AS	UC	GI 6304	Genetic engineering	4	4				120.0	40.0	1/20	1/20		1/16	4/64	4.0									
9		AS	ES	IBZh 5305	Integrated biotechnology in animal husbandry	4	3				120.0	40.0	1/20	1/20		1/16	4/64	4.0									
10		BS	ES	MMZh 5210	Mathematical modeling in animal husbandry	4	2				120.0	40.0	1/20	1/20		1/16	4/64	4.0									
11		BS	ES	NOMI 5209	Fundamentals of scientific research	5	2				150.0	50.0	1/20	2/30		1/20	5/80	5.0									
12		AS	UC	ITPPZh 5302	Technological innovation of livestock products	4	2				120.0	40.0	1/20	1/20		1/16	4/64	4.0									
13		AS	UC	ITPPZh 5307	Technological innovation of livestock products	4	3				120.0	40.0	1/20	1/20		1/16	4/64	4.0									
14		AS	ES	ITZh 6306	Information technologies in livestock	5	4				150.0	50.0	1/20	2/30		1/20	5/80	5.0									
<b>Scientifically research</b>																											
15		The research work of a master student	RW	CS	NIRMVVMD 5506	Master student's research work, including implementation of master's thesis	1					30.0							1.0								
16			RW	CS	NIRMVVMD 5501	Master student's research work, including implementation of master's thesis	1					30.0								1.0							
17			RW	CS	NIRMVVMD 5502	Master student's research work, including implementation of master's thesis	1					30.0									1.0						
18			RW	CS	NIRMVVMD 6503	Master student's research work, including implementation of master's thesis	3					90.0										3.0					
19	RW		CS	NIRMVVMD 6504	Master student's research work, including implementation of master's thesis	10					300.0											10.0					
20	RW		CS	NIRMVVMD 6505	Master student's research work, including implementation of master's thesis	8					240.0														8.0		
21		BS	UC	IP 5206	Research practice	4					120.0														4.0		
22		BS	UC	PP 6202	Teaching practice	2					60.0															2.0	
23		BS	UC	IP 6207	Research practice	6					180.0															6.0	
24		BS	UC	IP 6208	Research practice	10					300.0															10.0	
<b>Total of theoretical course</b>						62	14	0	0	0	3240	620	230	390	0	248	992										
AC	<b>Additional courses</b>					46																					
PP	Teaching practice					2		4		4																	
RP	Research practice					20		3, 4, 5		5																	
MSSRW	Master student's research work, including implementation of master's thesis					24				1, 2, 3,																	
FA	<b>Final attestation</b>					12																					
	Master dissertation defence					12				6																	
	<b>Total</b>					120					3600	620	230	390	0	248	992										

**Appendix 3. Matrix of achievability of the formed learning outcomes according to the educational program with the help of academic disciplines**

№	Name of the discipline	Brief description of the discipline	Number of credits	Generated learning outcomes									
				ON1	ON2	ON3	ON4	ON5	ON6	ON7	ON8	ON9	ON10
<b>Cycle of basic disciplines University component</b>													
1	Foreign language (professional)	Language of professional and academic purpose at an advanced level, scientific and conceptual apparatus of the specialty, scientific information base, interpretation of scientific information, argumentation, persuasion, scientific controversy, academic writing.	5	v									
2	History and philosophy of science	The structure and functions of scientific knowledge, methods of science in their professional activities; differences between ideological, political, religious constructions from scientific concepts. Means and methods of modern science, analysis of philosophical and ideological, epistemological, logical and methodological issues, the style of scientific thinking.	5		v								
3	Pedagogics of higher school	Fundamentals of pedagogy of high school. Subject and tasks of pedagogy of higher school. Methodology and methods of pedagogical research in higher education. Didactics of higher school. Pedagogical process in higher school. Laws and principles of training. Methods, forms and means of higher education. The current state of higher education in the Republic of Kazakhstan. Professional development	3			v							

		of a teacher of higher education. The process of education in higher education. The purpose of education as a pedagogical problem. Teaching and educational team as a form of functioning of a holistic pedagogical process.												
4	Psychologyofmanagement	Introduction to the psychology of management. Conceptual apparatus of the psychology of management. Leader and team. Conflicts in the workplace. Managerial communication. Decision making technology. The concept of the subject and object of management. Leader and leader. Psychology of the order. Personality as a subject and object of management. Democratic leadership style and its features. Psychology of criticism. Psycho types of subjects of communication. Psychological persuasive technique. Psychological problems of selection of leading cadres. Psychological problems of training and retraining of managerial personnel. Selection and placement of personnel. Staffrotation. Certificationandstaffturnover.	5				v							
<b>Cycle of basic disciplines Component of choice</b>														
1	EnglishforAcademicPurposes	Comprehensive theoretical and linguistic, practical and informational-analytical training in order to perform functions related to the use of a foreign language in professional and scientific activities: possession of public speaking skills, conducting discussions, the	5	v										

		ability to work with information from various sources, edit texts of professionally significant content in a foreign language.											
2	Foreign language for academic purposes	Use of a foreign language in professional and scientific activities, possession of public speaking skill, conducting discussion, the ability to work with information from various sources, edit texts of professionally content in a foreign language.	5	v									
3	Mathematical modeling in animal husbandry	The discipline reveals the concept of mathematical modeling and models, the process, the purpose of modeling in animal husbandry. Master students study abstract and material, speculative and verbal, informational and mathematical models. The discipline teaches undergraduates to establish the form of a connection between two features and the selection of a mathematical equation that expresses this connection. Functional, stochastic dependencies are mastered.	5					v					
4	Methodology of scientific research and analysis of zootechnical experiments	The content of the discipline covers the issues of setting up and conducting scientific research, registration of technical documentation; scientific activity; public speaking. Undergraduates acquire the skill of writing scientific letters, participating in scientific events and organizing them, conducting patent searches, protecting intellectual property rights, formulating goals, tasks related to the	5						v				



		implementation of professional functions. They master the adoption of specific organizational decisions to achieve the goals and objectives, interaction with various groups and institutions of power, society, and pedagogical activities. The discipline studies the use of foreign languages to the extent necessary for the implementation of professional, research, teaching activities. Instills skills in working with laws and other regulations in the field of conducting a scientific experiment, field and laboratory work.											
5	Fundamentals of scientific research	When studying the discipline, students master the stages of research work, including the choice of the direction of research, the formulation of a scientific and technical problem, and the conduct of theoretical and experimental research in animal husbandry. Master students acquire the skill of searching, accumulating and processing scientific information, as well as learning to conduct, process and formalize the results of experimental research. They master the methodological foundations of scientific research, types of research, experiment, formulation of the problem, methods of choosing and goals of the direction of scientific research, the course of scientific research, the main methodological techniques for setting up modern experiments, the form,	5					v					

		structure and design of scientific papers. They study the basic requirements for writing articles in scientific journals indexed by the Web of Science, Scopus, and other databases.											
6	Planning and modeling of the breeding process in animal husbandry	Knowledge of the above course will allow undergraduates, when conducting research work on animal breeding, to widely use many modern methods for analyzing the hereditary inclinations of an animal, to know the principles of operation of basic laboratory instruments and the rules for their operation, to correctly interpret the results of research and are necessary when preparing and writing a dissertation.	5					v					
<b>Cycle of profile disciplines University component</b>													
1	Technological innovation of livestock products	The discipline studies innovative technologies for breeding and reproduction of agricultural animals and poultry, innovative technologies in feeding agricultural animals and poultry, innovative technologies for increasing the productivity of agricultural animals and poultry, innovative technologies for improving the quality of livestock products and poultry farming, innovative technologies for the production of beef, milk, lamb, horse meat, koumiss, pork, eggs and poultry meat. The discipline gives the skills to apply modern methods of feeding, breeding, breeding	8						v				

		work in scientific work. Master students master the skill of determining the efficiency of growing farm animals, ensuring the rational maintenance, feeding and breeding of all types of farm animals and making decisions in the conditions of innovative technologies.											
2	Geneticengineering	In the course of studying the discipline will be in-depth studied the theoretical principles of expression of genetic material cultured animal cells, genetic engineering, and the stages of their formation, enzymes used in genetic engineering and genetic entity of genetic and cell engineering; embryogenesis, embryoculture research in animal husbandry; methods of genetic engineering, the identification of the genes and the combination of methods of adaptive system of selection.	4								v		
3	Methods of animals genetic evaluation and selection-breeding work	The discipline introduces master students to the quantitative and qualitative features of the genetic assessment of animals. The discipline reveals the concept of animal breeding for resistance and the release of populations from genetic marriage. Undergraduates study information systems for large-scale animal breeding, the genetic foundations of farm animal breeding, the genetic structure of a population, selection traits, selection within a population,	5								v		

		population-genetic parameters of economically useful traits. The discipline studies the breeding value of animals, genetic markers, types of genetic markers, allows for genetic control in animal breeding based on markers and analysis of the genetic structure of chromosomes. Master students master the regulations governing the certification of breeding material in the Republic of Kazakhstan.											
4	Statistical analyzes in animal husbandry	The discipline studies the programs of statistical observation of the activities of the industry. Master students master methods for determining the system of indicators that characterize the results of livestock activities. The discipline provides the skills to analyze the structure and structural shifts in the volume of production of the main types of livestock products, the analysis of various factors that affect the results of livestock farming	4					v	v				v
<b>Cycle of profile disciplines Component of choice</b>													
1	Information technologies in livestock	The discipline considers information systems in animal husbandry, regulations in the field of animal husbandry, rules for identifying farm animals, rules for subsidizing livestock breeding. Introduces the work of breeding and distribution centers. Gives the concept of Services - cattle, small ruminant, appraisal of cattle, small ruminant. Automatic work place of boniter, event planning, pedigree	4										v

		<p>reporting forms, buying and selling semen on the farm. Master students master information software products for planning feeding and calculating diets based on a general methodological principle. The discipline provides skills in the use of digital technologies and software applications used in international practice for feeding control, fodder preparation, storage, formulating compound feed, in the biometric processing of the obtained scientific research results; skills in using computerized platforms and services such as <a href="https://msusheepration.montana.edu">https://msusheepration.montana.edu</a> (MSU Sheep Ration Program), <a href="https://www.sites.ext.vt.edu">https://www.sites.ext.vt.edu</a> (Ration Balancing Software: DAIR4, NRC Dairy, Spartan, CNCPS, and CPM), <a href="http://www.korall-agro.ru/">www.korall-agro.ru/</a>, <a href="https://plinor.ru">https://plinor.ru</a>, <a href="https://ama.spbgau.ru">https://ama.spbgau.ru</a></p>											
2	Integrated biotechnology in animal husbandry	<p>During the study of the discipline "Integrated biotechnology in animal husbandry" will consider the subject and objectives of integrated biotechnology in animal husbandry. The processes of development of new directions of agricultural biotechnology, including embryo transplantation in animal husbandry, reproductive and molecular biotechnology in animal reproduction, methods of modern biotechnology in agriculture will be considered.</p>	4										v

3	Molecular genetic basics of biotechnology	Application of knowledge and methods of molecular biology and genetics in the performance of scientific research; Hereditary information, composition, structure, functions and patterns of chromosomes, genes and genomes. Getting new varieties and improving the existing qualities of agricultural plants. Recombinant DNA based on molecular biology and genetics. Biological systems used in biotechnology, their features. Chimeric proteins and protein stabilization. Synthesis and DNA sequencing methods	4									v
4	Digital animal husbandry	The discipline provides knowledge about the functional capabilities of livestock breeding subjects in the information and analytical system of livestock breeding. Master students digital technologies in the production of livestock products, methods for their comprehensive assessment and effective use, and zootechnical accounting. They master the skills of checking and controlling the entered information and planning events in the information and analytical system.	4								v	



			<p>2 Основы философии: учеб. пособие / Р.К. Турысжанова; М-во образования и науки РК. - 2-е изд. - Қарағанды: Medet Group, 2014. - 250 с.</p> <p>3 История и философия науки: учеб. пособие для магистрантов / Р.К. Турысжанова, М.К. Ташбулатова ; М-во образования и науки РК. - Алматы : Medet Group, 2014. - 292 с.</p> <p>4 Кенни, Э. Батыс философиясының жаңа тарихы . 1 том. Антика философиясы / Э. Кенни ; ауд.: А. С. Аяпбекова, Н. Т. Базарбай, А. Рыскиева ; ағылшын тілінен аударма. - Алматы : Ұлттық аударма бюросы, 2018. - 408 б.</p>		<p>49</p> <p>49</p> <p>60</p>
3	Pedagogics of higher school	10	<p>1 Сағалиева Ж.К., Сейлхан Г.И. Педагогика. Оқу құралы.-Астана: С. Сейфулина. ҚазАТУ баспасы, 2018.- 188 б.</p> <p>2 Ахметова Г.К., Исаева З.А. Педагогика: Учебник для магистратуры университетов. - Алматы: Казак университеті, 2019. - 328 с.</p> <p>3 Мынбаева А.К. Основы педагогики высшей школы: Учебное пособие. - Алматы, 2018. - 190 с.</p> <p>4 Сағалиева, Ж. К. Педагогика : оқу құралы / Ж. К. Сағалиева, Р. С. Омарова, Г. І. Сейілхан ; пікір беруші: З. Д. Баубекова, Ш. М. Майгелдиева, Т. Т. Ғалиев. - Астана : С.Сейфуллин атындағы ҚазАТУ, 2016. - 188 б.</p>	<p>1 Баширова Ж.Р. Развитие университетского образования в аспекте подготовки преподавателя высшей школы. Монография. -Алматы: АТУ им. Абая, 2018. - 160 с.</p> <p>2 Кредитная система обучения в вузе. - Алматы: Казак университеті, 2018. – 180 с.</p>	<p>28</p> <p>Web resources</p> <p>Web resources</p> <p>30</p>



4	Psychology of management	10	<p>1 Захарова, Л.Н. Басқару психологиясы: Оқулық / Л.Н. Захарова. - М.: Логотиптер, 2013 ж.- 376 б.</p> <p>2 Н.С.Ахтаева, А.И.Абдигапбарова, З.Н.Бекбаева. Басқару психологиясы Оқу құралы. Ал-маты «Қазақ университеті» 2018ж.</p> <p>3 Умбиталиев А.Д.«Басқару психологиясы»: оқу құралы / А.Д.Умбиталиев, К.Б. Сатымбекова, Г.Е. Керімбек / Алматы: 2017. - 464 бет</p> <p>4 Руденко А.М. Управленческая психология / А.М.Руденко — Ростов н/Д: Феникс, 2019</p> <p>5 Майерс, Д. Г. Әлеуметтік психология : оқулық / Д. Г. Майерс, Ж. М. Туенж ; ауд.: Г. Қ. Айқынбаева [ж.б.] ; Ағылшын тілінен аударма. - 12-басылым. - Алматы : Ұлттық аударма бюросы, 2018. - 648 б.</p>	<p>1 Базаров, Т.Ю. Персоналды басқару психологиясы: академиялық бакалаврға арналған оқулық пен семинар / Т.Ю. Базаров. - Люберцы: Юрайт, 2016. - 381 б.</p>	<p>1</p> <p>5</p> <p>57</p>
5	English for Academic Purposes	10	<p>1. Justin Zobel. Writing for Computer Science. The university of Melbourne, Parkville, Australia Third Edition, 2014.</p> <p>2. Carolyn Brimley Norris, Ph.D. Academic Writing in English. Language Services, University of Helsinki, 2016.</p> <p>3. Stephen Bailey, Academic Writing: A Handbook for International Students, (2011) by Routledge, Milton Park, Abingdon.</p> <p>4 Войнатовская, С. К. Английский</p>		<p>Web resources</p> <p>10</p>

			язык для зооветеринарных вузов: учебное пособие / С. К. Войнатовская. - СПб. : Лань, 2018. - 240 с.		
6	Foreign language for academic purposes	10	<p>1. Justin Zobel. Writing for Computer Science. The university of Melbourne, Parkville, Australia Third Edition, 2014.</p> <p>2. Carolyn Brimley Norris, Ph.D. Academic Writing in English. Language Services, University of Helsinki, 2016.</p> <p>3. Stephen Bailey, Academic Writing: A Handbook for International Students, (2011) by Routledge, Milton Park, Abingdon.</p> <p>4 Белоусова, А. Р. английский язык для студентов сельскохозяйственных вузов: учеб. пособие / А. Р. Белоусова, О. П. Мельчина. - 5-е изд., стер. - СПб. : Лань, 2016. - 352 с.</p>		<p>Web resources</p> <p>4</p>
7	Mathematical modeling in animal husbandry	10	<p>1 Гмурман В.Е. Теория вероятностей и математическая статистика. – М.: Научная школа, 2014.</p> <p>2 Кремер Н.Ш. Теория вероятностей и математическая статистика. –М., Научная школа, 2016.</p> <p>3 DeGroot М.Н., Schervish М. J. Probability and Statistics-Addison Wesley, 2015.</p> <p>4 Мукашева, Н. А. Моделирование систем : учебное пособие / Н. А. Мукашева ; Министерство образования и науки Республики</p>	<p>1 А.В.Агуова, L.K. Dyusseмбаева, A.G. Zharoeva . Probability theory and discrete mathemat-ics.- Астана 2018.</p>	<p>43</p> <p>Web resources</p> <p>1</p>

			Казахстан, Казахский агротехнический университет им. С. Сейфулина. - Астана : КазАТУ им. С. Сейфуллина, 2014. - [2], 158 с.		
8	Methodology of scientific research and analysis of zootechnical experiments	10	1 S.Bostanova, I.Mukhametzharova. Research in animal husbandry. - Nur-Sultan 2020. 2 Бостанова, С.К. Научные исследования в животноводстве: учеб. пособие / С.К. Бостанова ; рец.: К.Н. Баязитова, Б.С. Майканов ; М-во сельского хоз-ва РК, Каз. агротехн. ун-т им. С.Сейфуллина. - Астана : КазАТУ им. С.Сейфуллина, 2018. - 111 с.	1 McIntire, John Grace, The Impact of the International Livestock Research Institute. eBook. ISBN: 978-1-78924-185-3. Delia UK: CABI, 2021. 2 Webster, John. Animal Husbandry Regained [Текст] : the place of farm animals in sustainable agriculture / J. Webster. - London : Routledge, 2013. - 243 p : il. Index: p. 239 - 243. - ISBN 978-1-84971-421-1	20 20 1
9	Fundamentals of scientific research	10	1 S.Bostanova, I.Mukhametzharova. Research in animal husbandry. - Nur-Sultan 2020. 2 Бостанова, С.К. Научные исследования в животноводстве: учеб. пособие / С.К. Бостанова ; рец.: К.Н. Баязитова, Б.С. Майканов ; М-во сельского хоз-ва РК, Каз. агротехн. ун-т им. С.Сейфуллина. - Астана : КазАТУ им. С.Сейфуллина, 2018. - 111 с.	1 McIntire, John Grace, The Impact of the International Livestock Research Institute. eBook. ISBN: 978-1-78924-185-3. Delia UK: CABI, 2021. 2 Webster, John. Animal Husbandry Regained [Текст] : the place of farm animals in sustainable agriculture / J. Webster. - London : Routledge, 2013. - 243 p : il. Index: p. 239 - 243. - ISBN 978-1-84971-421-1	20 20 1
10	Planning and modeling of the breeding process in animal husbandry	10	1 Гмурман В.Е. Теория вероятностей и математическая статистика. – М.: Научная школа, 2014. 2 Кремер Н.Ш. Теория вероятностей и математическая статистика. –М., Научная школа, 2016. 3 DeGroot М.Н., Schervish М.М.	1 А.В.Аруова, Л.К. Dyusseмбаева, А.Г. Zharoeva . Probability theory and discrete mathematics.- Астана 2018.	43 Web resources

			<p>Probability and Statistics-Addison Wesley, 2015.</p> <p>4 Мукашева, Н. А. Моделирование систем : учебное пособие / Н. А. Мукашева ; Министерство образования и науки Республики Казахстан, Казахский агротехнический университет им. С. Сейфулина. - Астана : КазАТУ им. С. Сейфуллина, 2014. - [2], 158 с.</p>		1
11	Technological innovation of livestock products	10	<p>1 Применение элементов цифровых технологий в молочном скотоводстве Северного Казахстана / Л. В. Алимжанова [и др.]. ; рец.: С. К. Шауенов, К. Н. Баязитова, К. Ш. Нургазы ; М-во сельского хоз-ва РК, Каз. агротехн. ун-т им. С.Сейфуллина. - Нур-Султан : КазАТУ им. С.Сейфуллина, 2020. - 84 с</p>	<p>1 Zachariah, Annie Bobby. Precision Agriculture and the Future of Farming. Ashland: Delve Publishing. 2019. eBook.</p> <p>2 Advances in Sensors, Big Data and Machine Learning in Intelligent Animal Farming. MDPI - Multidisciplinary Digital Publishing Institute, 2022. eBook.</p>	20 Web resources
12	Genetic engineering	10	<p>1 Кенжебаева, С. С. Биотехнологиядағы қазіргі әдістер [Текст] : оқулық / С. С. Кенжебаева ; Қазақстан Респ. білім және ғылым министрлігі. - Алматы : Бастау, 2013. - 200 б</p> <p>2 Биотехнология [Текст] : оқу құралы / Қ. Х. Әлмағамбетов [ж.б.]. - 2-ші бас. - Қарағанды : АҚНҰР, 2012. - 316 б : сурет., кестелер. - ISBN 978-601-06-1542-7</p> <p>3 Генетика негіздері : оқулық. 2-том / У. С. Клаг [ж.б.]. ; ауд. Б. О. Бекманов ; ағылшын тілінен ауд. - 11-бас. - Алматы : ЖШС РПБК</p>	<p>1 Биотехнология животных [Текст] : учебно-метод. пособие / Г. Ж. Сарсеке-ева [и др.]. ; М-во образования и науки РК, АТУ. - Алматы : Альманах, 2017. - 62 с. - ISBN 978-601-7900-75-5</p> <p>2 Зотиков В.И. Чернова Л.И. Генетическая инженерия. Орел, Издатель-ство: Государственное научное учреждение ВНИИ зернобобовых и крупяных культур РАСН, 2012. – 100 с.</p>	3  3  25

			"Дәуір", 2017. - 820 б.		
13	Methods of animals genetic evaluation and selection-breeding work	10	1 Современные аспекты племенной работы в скотоводстве Учеб пособие. Астана: КАТУ им. С. Сейфуллина, 2012. - 205 с. 2 Общая генетика: Электронный учебник. - Караганда: КарГТУ, 2017. 3 Разведение животных : учебник для студентов вузов / В. Г. Кахикало [и др.]. - 2-е изд., испр. и доп. - СПб. : Лань, 2014. - 448 с.	1 Генетика: Практикум. - Алматы: Нур-принт, 2013. – 184 б.	5  15  5
14	Statistical analyzes in animal husbandry	10	1 Маянская А.С. Статистика (общая теория статистики). Учебное пособие. Новокузнецк, 2019 2 Животноводство В.В. Лященко, А.С. Делян /С.П., М, Краснодар, 2014г, 635 с. 3 Аскарлов, Е. С. Статистические методы в управлении качеством : учебное пособие / Е. С. Аскарлов. - Алматы : Экономика, 2012. - 186 с.	1 Методологическое положение о статистике. Министерство национальной экономики Республики Казахстан Комитет по статистике главный редактор Айдапкелов Н.С., Астана 2018 год 2 Словарь статистических терминов и словосочетаний. Астана 3 Свод статистических данных по республике Казахстан Астана 2015г. 4 Рекомендации по проведению статистического учета сельскохозяйственной продукции в РК Астана 2015г 5 Закон «О государственной статистике» РК	1  1  1
15	Information technologies in livestock	10	1 Лукьянов Б.В., Лукьянов П.Б. Руководство Пользователя по компьютерным программам КОРАЛЛ 2 Нурпеисова, Т. Б. Информационно-коммуникационные	1 Асыл тұқымды мал шаруашылығы туралы / Қазақстан Республикасының 1998 жылғы 9 шілдедегі N 278 Заңы.ҚР 27.11.2015 № 424-V Заңымен өзгерістер енгізілген;	Web resources   29

			технологии : учеб. пособие / Т. Б. Нурпеисова, И. Н. Кайдаш ; М-во образования и науки РК. - Алматы : Бастау, 2017. - 544 с.	2 Ауыл шаруашылығы жануарларын бірдейлендіру қағидаларын бекіту туралы (Қазақстан Республикасының Ауыл шаруашылығы министрінің 2015 жылғы 30 қаңтардағы № 7-1/68 бұйрығы)	
16	Integrated biotechnology in animal husbandry	10	1 Лебедько Е. Я., Катмаков П. С., Бушов А. В., Гавриленко В. П. Биотехнология в животноводстве . Учебное пособие для СПО. Издательство "Лань", 2021. – 322с. 2 Лебедько Е. Я., Катмаков П. С., Бушов А. В., Гавриленко В. П. Биотехнология в животноводстве. Учебник. – Санкт – Петербург: Лань, 2020. – 160с. 3 Журавлева Г. А. Генная инженерия в биотехнологии /– Санкт – Петербург: Издательство Эко-Вектор, 2016. – 328 с. 4 Ауыл шаруашылық биотехнологиясы : оқулық / Х. Ә. Аубакиров [ж.б.]. - Алматы : ҚР жоғары оқу орындарының қауымдастығы, 2013. - 490 б	1 Сокова О.Т. Биотехнологии животных. Учебно-методическое пособие. Алматы: CyberSmith, 2019.-188 ст.	49
17	Molecular genetic basics of biotechnology	10	1 Лебедько Е. Я., Катмаков П. С., Бушов А. В., Гавриленко В. П. Биотехнология в животноводстве . Учебное пособие для СПО. Издательство "Лань", 2021. – 322с. 2 Лебедько Е. Я., Катмаков П. С., Бушов А. В., Гавриленко В. П. Биотехнология в животноводстве. Учебник. – Санкт – Петербург: Лань,	1 Сокова О.Т. Биотехнологии животных. Учебно-методическое пособие. Алматы: CyberSmith, 2019.-188 ст.	

			2020. – 160с. 3 Журавлева Г. А. Генная инженерия в биотехнологии /– Санкт – Петербург: Издательство Эко-Вектор, 2016. – 328 с. 4 Ауыл шаруашылық биотехнологиясы : оқулық / Х. Ә. Аубакиров [ж.б.]. - Алматы : ҚР жоғары оқу орындарының қауымдастығы, 2013. - 490 б		49
18	Digital animal husbandry	10	1 Лукьянов Б.В., Лукьянов П.Б. Руководство Пользователя по компьютерным программам КОРАЛЛ 2 Нурпеисова, Т. Б. Информационно-коммуникационные технологии : учеб. пособие / Т. Б. Нурпеисова, И. Н. Кайдаш ; М-во образования и науки РК. - Алматы : Бастау, 2017. - 544 с.	1 Асыл тұқымды мал шаруашылығы туралы / Қазақстан Республикасының 1998 жылғы 9 шілдедегі N 278 Заңы.ҚР 27.11.2015 № 424-V Заңымен өзгерістер енгізілген; 2 Ауыл шаруашылығы жануарларын бірдейлендіру қағидаларын бекіту туралы (Қазақстан Республикасының Ауыл шаруашылығы министрінің 2015 жылғы 30 қаңтардағы № 7-1/68 бұйрығы)	Web resources  29

### Map №2.

Information about the availability of educational and scientific literature on digital media

NJSC «S.Seifullin KATU» of the Department «Technology of production and processing of animal products» for the 2022-2023 academic year

№ i/n	Academic discipline by profession, direction of personnel training, by specialty qualifications being prepared	Name, year of creation	The author(s)	Information about the presence of a subscription to international, national databases
1	2	3	4	5
1	Foreign language (professional)	«Кәсіби бағытталған шетел тілі» пәні	Бекенова Ш.Ш., Жұқып Д.	<a href="http://repository.kazatu.kz/jspui/handle/123456789/1006">http://repository.kazatu.kz/jspui/handle/123456789/1006</a>

		бойынша тәжірибелік сабақтарға арналған практикум к практикалык занятиям по дисциплине «Профессионально-ориентированный иностранный язык»/С.Сейфуллин атындағы Қазақ агротехникалық университеті-2016	Байбусенов К.С.	
2	History and philosophy of science	Философия тарихы, 2018	Есбол Ф.Ш.	<a href="http://rmebrk.kz/book/1158234">http://rmebrk.kz/book/1158234</a>
3	Pedagogics of higher school	Педагогика высшей школы, 2019	Ибраева К.Ж.	<a href="https://e.lanbook.com/book/233915">https://e.lanbook.com/book/233915</a>
4	Psychology of management	Басқару психологиясы, 2016	В.В. Козлов	<a href="http://dialogue-irk.ru/kk/beznalichnye/spisok-ispolzovannoi-literatury-po-psihologii-upravleniya-aktualnyi/">//dialogue-irk.ru/kk/beznalichnye/spisok-ispolzovannoi-literatury-po-psihologii-upravleniya-aktualnyi/</a>
		Психология управления, 2021	Т.А. Бергис	<a href="https://e.lanbook.com/book/243236">https://e.lanbook.com/book/243236</a>
5	English for Academic Purposes	Английский язык для академических целей, 2017	Волченкова К.Н.	<a href="https://e.lanbook.com/book/260285">https://e.lanbook.com/book/260285</a>
6	Foreign language for academic purposes	Facing challenges in writing (Преодолевая трудности письменной речи), 2022	В.Ф. Гревцева, М.Н. Клевина	<a href="https://e.lanbook.com/book/266909">https://e.lanbook.com/book/266909</a>
7	Mathematical modeling in animal husbandry	Математикалық модельдеуге кіріспе, 2019	Муқанова Б.Г., Хаджиева Л.А.	<a href="http://rmebrk.kz/book/1177637">http://rmebrk.kz/book/1177637</a>
8	Methodology of scientific research and analysis of zootechnical experiments	Логика и методология научного исследования, 2022	Шорохова С.П.	<a href="https://www.iprbookshop.ru/119090.html">https://www.iprbookshop.ru/119090.html</a>



		Animal breeding and genetics for BSc students, 2014	Kor Oldenbroek en Liesbeth van der Waaij	<a href="https://www.wur.nl/upload_mm/d/b/b/614bcc19-036f-434e-9d40-609364ab26da_Textbook%20Animal%20Breeding%20and%20Genetics-v17-20151122_1057.pdf">https://www.wur.nl/upload_mm/d/b/b/614bcc19-036f-434e-9d40-609364ab26da_Textbook%20Animal%20Breeding%20and%20Genetics-v17-20151122_1057.pdf</a>
9	Fundamentals of scientific research	Методы научных исследований, 2019	С.Ю. Махов	<a href="https://www.iprbookshop.ru/95404.html">https://www.iprbookshop.ru/95404.html</a>
		Методология научных исследований, 2014	А.Б. Пономарев, Э.А. Пикулева	<a href="https://pstu.ru/files/file/adm/fakultety/ponomarev_Pikuleva_metodologiya_nauchnyh_issledovaniy.pdf">https://pstu.ru/files/file/adm/fakultety/ponomarev_Pikuleva_metodologiya_nauchnyh_issledovaniy.pdf</a>
10	Planning and modeling of the breeding process in animal husbandry	Математикалық және компьютерлік модельдеу негіздері, 2014	Сұлтанов М.А.	<a href="http://rmebrk.kz/book/1020590">http://rmebrk.kz/book/1020590</a>
11	Technological innovation of livestock products	Инновационные технологии производства продукции животноводства, 2012	Д.К. Найманов	<a href="http://rmebrk.kz/book/1024698">http://rmebrk.kz/book/1024698</a>
		Big Data and Machine Learning in Intelligent Animal Farming, 2022	Yongliang Qiao, Lilong Chai, Dongjian He	<a href="https://www.mdpi.com/books/book/5492">https://www.mdpi.com/books/book/5492</a>
12	Genetic engineering	Наглядная биотехнология и генная инженерия, 2015	Шмид Р.	<a href="https://bioengineering.kpi.ua/attachments/article/265/R_Shmid_Naglyadnaya_biotechnologiya_i_geneticheskaya_ingeneriya_2014.pdf">https://bioengineering.kpi.ua/attachments/article/265/R_Shmid_Naglyadnaya_biotechnologiya_i_geneticheskaya_ingeneriya_2014.pdf</a>
		Гендік жасушалық инженерия, 2017	Найманов Д.К., Калбаева А.М.	<a href="http://rmebrk.kz/book/1168777">http://rmebrk.kz/book/1168777</a>
13	Methods of animals genetic evaluation and selection-breeding work	Планирование селекционно-племенной работы в животноводстве, 2020	Свяженина М.А.	<a href="https://e.lanbook.com/book/175141">https://e.lanbook.com/book/175141</a>
		Состояние всемирных генетических ресурсов	С.Н. Харитонов, Т.Т. Глазко и др.	<a href="http://www.fao.org/3/a1250r/a1250r.pdf">http://www.fao.org/3/a1250r/a1250r.pdf</a>

		животных в сфере продовольствия и сельского хозяйства, 2010		
14	Statistical analyzes in animal husbandry	Методологическое положение о статистике. 2018	Министерство национальной экономики Республики Казахстан	<a href="https://stat.gov.kz">https://stat.gov.kz</a>
		Прикладной статистический анализ данных, 2018	Е.С. Каган	<a href="https://e.lanbook.com/book/134318">https://e.lanbook.com/book/134318</a>
15	Information technologies in livestock	«Информационные технологии в науке и производстве» (Информационные технологии в науке и производстве, 2020)	Т.Ю. Гусева	<a href="https://e.lanbook.com/book/171669">https://e.lanbook.com/book/171669</a>
		Жүйе қолдану бойынша нұсқаулық 2015	Республиканская система животноводства информационно-аналитическая система	<a href="http://www.plem.kz/Ақпараттық-сараптамалық">http://www.plem.kz/Ақпараттық-сараптамалық</a>
16	Integrated biotechnology in animal husbandry	Жануарлар биотехнологиясы, 2014	Х.Ә. Аубакиров, Н.Н. Әлібаев, М.Д. Кенжеходжаев	<a href="http://rmebrk.kz/book/1004429">http://rmebrk.kz/book/1004429</a>
17	Molecular genetic basics of biotechnology	Биотехнология в животноводстве, 2018	Т.Ю. Гусева.	<a href="https://e.lanbook.com/book/133505">https://e.lanbook.com/book/133505</a>
18	Digital animal husbandry	Ақпараттық технологиялар, 2012	Асқарова Н.Т., Шайқұлова А.Ә.	<a href="http://rmebrk.kz/book/1162618">http://rmebrk.kz/book/1162618</a>
		Руководство	Лукьянов Б.В.,	<a href="https://www.korall-agro.ru/articles/KORALL.pdf">https://www.korall-agro.ru/articles/KORALL.pdf</a>

		Пользователя компьютерным программам КОРАЛЛ – 2016	по Лукьянов П.Б.	
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Chairman of the FCAQ Faculty of  
Veterinary and Animal Husbandry  
Technology

Shaikenova K.H.

Head of the Department «Technology of  
production and processing of animal  
products»

Bostanova S.K.

		Пользователя компьютерным программам КОРАЛЛ – 2016	по Лукьянов П.Б.	
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Chairman of the FCAQ Faculty of Veterinary and Animal Husbandry Technology

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*Bostanova*

Bostanova S.K.