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

Reviewed byat the meeting of the
University Academic Council
Minutes № 15
« 30 » 05 2019.

Chairman of the Board of S.Seifullin
Kazakh AgroTechnical University
A.K.Kurishbayev
« » 2019.

EDUCATIONAL PROGRAM
«Intensive fish breeding»

Code and classification of educationfield: 7M08 Agriculture and bioresources

Code and classification of training direction: 7M084 Fishery

Code in the International Standard Classification of Education: 0811
Qualification: Master of Agriculture in the educational program "Intensive fish breeding»

Studying period: 2year.

Nur-Sultan 2019

Update EPVO – 27.07.2023
Academic Committee:
Chairman - Aubakirova Gulzhan Amanzholovna – PhD, ass.professor
Академический комитет:
Members of the Committee:
1. Barinova Gulnaz Kaldybaevna – Candidate of Biological Sciences, acting ass. professor
2. Asylbekova Ainur Serikbayevna – Candidate of Agricultural Sciences, ass. professor
3. Bazhenova Diana Alexandrovna – 3rd year of the EP "Aquaculture and aquatic bioresources"
4. Zhubaev Askhat Bakhtygalievich - Head of the Department of Reproduction of Fish Resources of the Committee of Fisheries of the Ministry of Fisheries of the Republic of Kazakhstan
5. Ayan Kairatovich Bakhiyanov – Deputy Chairman of the Fisheries Committee of the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan

The Academic Committee was approved by Order No. 516-N of 04.10.2022 for the S.Seifullin Kazakh Agro Technical Research University.

The educational program "7M08401-Intensive Fish farming" was reviewed at the meeting of the Department of Hunting and Fisheries Protocol № 11 of " 11 " 05 2023 .

approved by the Council of the Faculty of Forestry, Wildlife and Environment Protocol № 9б " 25 " 05 2023.

Content

1 Passport of the educational program

1.1 The purpose of the educational program is to provide undergraduates with theoretical knowledge and practical skills in the field of fish farming development due to the needs of the state and the market, as well as to prepare specialists capable of formulating and solving modern scientific and practical problems at the intersection of sciences.

The main objectives of this educational program are:

- providing fundamental knowledge at the intersection of biology and agricultural sciences, guaranteeing their professional mobility in the real developing world;
- acquisition of skills in organizing and conducting scientific fisheries research, obtaining the necessary foundation for continuing scientific work in doctoral studies;
- obtaining the necessary minimum knowledge in the field of pedagogy and psychology and pedagogical experience.
- development of abilities for self-improvement and self-development, needs and skills of independent creative mastery of new knowledge throughout their active life.

1.2 Learning outcomes

ON 1 – To have an idea: about current trends in the development of scientific knowledge, about current methodological and philosophical problems of science. To analyze the psychological conditions and features of management activities in order to improve the efficiency and quality of work in the management system. Possess the concept of methods of pedagogical research and the pedagogical process in higher education.

ON 2 – Have the ability to search for scientific and professional information in a foreign language using network technologies. Be able to support both written and oral communication on professional and scientific topics. Possess the skills of abstracting, analyzing and producing oral and written speech of an academic orientation. To know the influence of abiotic factors on the distribution and behavior of fishing objects.

ON 3 – Possess knowledge about the types of aquatic ecosystems, conservation and rational use of water resources. Know the methods of research in the fisheries, the organization of field observations and expedition trips of complex research. Possess the ability to use the legal foundations of trapping, protection, and management of aquatic biological resources. Know the characteristics of various fresh waters, biochemical indexing of toxic effects on fish.

ON 4 – To have an idea of new and improved breeds in the fish breeding of the breeding farm of the highest type. To know the technology of growing producers, repairing young animals and mass production of juveniles for the needs of industrial farms in breeding grounds-reproducers. Be able to generalize and analyze the results of scientific research.

ON 5 – Master the concepts of the biological foundations of the rational use and protection of aquatic biological resources, basic concepts for the distribution of aquatic biological resources in the Republic of Kazakhstan, basic legislative acts in the field of protection of aquatic biological resources. Be able to conduct an expert assessment of aquatic biological resources, use the provisions of the legislative framework in the work on the protection and rational use of aquatic biological resources.

ON 6 – Be able to carry out and plan fishery activities in small and medium-sized reservoirs, technological processes of sturgeon fish cultivation using modern methods, issues of the prevalence of infectious, invasive and non-infectious fish diseases, the impact of toxic products on the ichthyofauna and productivity of reservoirs. Have an understanding of the principles and methods of acclimatization of hydrobionts.

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

The educational program "Intensive fish farming" was created in accordance with the Law of the Republic of Kazakhstan dated July 9, 2004 "On the protection, reproduction and use of wildlife", taking into account the request of employers. This educational program solves the issues of aquaculture development and sets goals and objectives for the development and implementation of innovative technologies for growing new aquaculture facilities, which will allow the future specialist to form core competencies.

The relevance of the educational program lies in the fact that a program for the development of fisheries and aquaculture is being developed in the Republic of Kazakhstan with the introduction of promising fish farming facilities with a fast growth rate and high productive qualities, which makes it possible to increase the general demand of the population for fish products. Also, the widespread use of innovative technologies is reflected in the educational program, which highlights the problems and tasks set. Kazakhstan has large areas of inland water bodies with a high potential for bioproductivity, which gives grounds for the full use of these resources with the use of modern technologies of intensive fish farming.

The peculiarity of this educational program is that it is synchronized with the educational programs of leading foreign universities in Finland, Malaysia, Poland, the Czech Republic, Turkey, etc.

The uniqueness of the educational program "Intensive fish farming" lies in the fact that it reflects the issues of modern intensive fish farming with the use of innovative scientific methods of economic activity of this industry, which reflects the selection work of the world's intensive fish farming experiments (the use of ultrasound, the use of aquaponics and hydroponics and other technologies).

3 Competence model (portrait) graduate

3.1 Spheres of professional activity: the Fisheries Committee of the Ministry of Ecology and natural resources of the Republic of Kazakhstan; fish farms;

fishing organizations and enterprises; nature protection organizations; fish processing enterprises; educational activities in higher, secondary specialized, vocational educational institutions of agricultural and biological profile; scientific and management activities in scientific and production institutions; management activities in the offices of local, district, regional, republican structures; breeding farms, zoos, nature reserves, nature museums; branch laboratories, divisions, sections, sectors, standardization and certification centers.

3.2 Types of professional activity: determination of biological productivity of reservoirs, breeding of fish and economically valuable hydrobionts in natural and artificial reservoirs; obtaining germ cells and insemination of eggs; biological provision of conditions for incubation of eggs and rearing of juvenile fish; intensification of fish-breeding processes; organization of breeding work; organization and operation of fish-breeding enterprises of all types; teaching ichthyological and hydrobiological disciplines in universities and other educational institutions of fisheries profile; to conduct research and development, to carry out design and survey work, scientific and organizational activities in various fields of fisheries; to carry out organizational and technological activities at all production enterprises of fisheries, to carry out management activities, performing management and marketing tasks.

3.3 General education competencies

Be able to independently solve issues regarding:

- collection, analysis and interpretation of information (instrumental competence);
- problems in new situations when growing valuable fish in the RAS;
- development of ideas and critical argumentation (interpersonal competence);
- self-motivation and self-management (system competence);
- implementation of methods and technologies of artificial reproduction and commercial cultivation of fish, feed invertebrates;
- development of plans for the rational use of aquatic biological resources, environmental protection measures.

3.4 Basic competencies

Have effective communication and social skills, including the ability to:

- preparation of feasibility studies and development of plans and programs of innovative projects;
- perform design and survey work using modern equipment and information technologies;
- use a foreign language fluently as a means of business communication;
- the ability to use regulatory legal documents regulating the organization and methodology of scientific research in the fisheries industry.
- the ability to improve and develop their intellectual and general cultural level;
- possession of a culture of thinking, the ability to generalize, analyze, perceive information, set goals and choose ways to achieve it;

- ability to control and, where possible, prevent tension and stress associated with performance activities (interpersonal competencies);

- the ability to logically correctly, argumentatively and clearly build oral and written speech.

3.5 Professional competencies

Be able to:

- plan the acquired knowledge for solving specific scientific, practical, information retrieval and methodological tasks;

- organize and conduct production, research and teaching activities;

- to assess the ecological condition and the fishery value of natural and artificial reservoirs;

- independently plan and conduct ichthyological or hydrobiological studies on reservoirs;

- to monitor aquatic biological resources;

- substantiate promising areas of aquaculture.

Have skills:

- to conduct fisheries and environmental monitoring of anthropogenic impact on aquatic biological resources;

- use innovative methods of growing promising fish farming facilities;

- possession of field methods of ichthyological and hydrobiological studies on reservoirs;

- when choosing methods of experimental work and presenting the results of scientific research;

- when determining the reserves of aquatic biological resources;

- on artificial reproduction and cultivation of hydrobionts;

- on the operation of technological equipment in aquaculture;

- apply new technologies for growing valuable fish species;

- to combat infectious and invasive diseases of hydrobionts;

- use regulatory documents regulating the organization and methodology of scientific research;

- to make a practical recommendation based on the results of scientific research.

4 The base of passing professional practices

Undergraduates according to the curriculum undergo pedagogical and research practices.

Pedagogical practice is conducted on the basis of the Department of Hunting and Fisheries together with the Department of Vocational Training.

The bases of research practice are SRC "Fisheries", the LLP "Scientific and production center of fisheries", NGO "Society of Hunters and Fishermen of Astana and Akmola region", LLP "Halyk-balyk", "Zerendinsky Fishery Enterprise", LLP "Kazakh Osseter", East-Kazakhstan regional public Association of hunters and fishermen, oceanarium "Ailand".

SIC "Fisheries" is a research unit that organizes and coordinates the development of fundamental and applied sciences in the field of fisheries. The purpose of SIC "Fisheries" is to determine the priorities for the development of the main areas of scientific research and the most relevant areas of fish farming, fishing and aquaculture; search for an optimal solution to the problem of integrating science and practice and training qualified scientific and pedagogical personnel; development of recommendations on the coordination of the activities of SIC "Fisheries" with related universities and research institutes on the formation of scientific programs carried out at the expense of the State budget on a competitive basis.

The Northern branch of LLP "Scientific and production center of fisheries" conducts research in the fisheries industry of the entire Northern and Central Kazakhstan. Implements monitoring of the ecological state of reservoirs of North Kazakhstan, Kostanay, Akmola and Karaganda regions, conduct bonitization of reservoirs in order to determine their fishery use.

5 The structure of the educational program of the magistracy in scientific and pedagogical direction

№ п/п	Name of cycles and disciplines	General labor input	
		in class periods	in the academic credits
1	2	3	4
1.	Theoretical training	2640	88
1.1	Cycle of Base requirements	1050	35
	University component	600	20
	including:		
	History and philosophy of science	150	5
1)	Foreign language (professional)	150	5
	Pedagogics of higher school	90	3
	Psychology of management	150	5
	Pedagogical training	60	2
	Electives component	450	15
	English for Academic Purposes / Fundamentals of fishing forecasting.	150	5
2)	Hydrobiology and freshwater ecology of the Republic of Kazakhstan/ Toxicology of freshwater Kazakhstan	150	5
	Organization of scientific researches in fishery / Sustainable management of living aquatic resources	150	5
1.2	Cycle of profession requirements	1590	53
	University component		
	Selection of breeding work in fish farming	150	5
	Biological productivity of reservoirs and sustainable use of genetic fund of living aquatic resources	180	6
1)	Innovative technologies in aquaculture	180	6
	Biotechnics of sturgeon cultivation in Kazakhstan	180	6
	Ichthypatoology and toxicology of inland waters of the Republic of Kazakhstan	150	5
	Theory and practice acclimatization	150	5

	hydrobionts		
	Research practice	600	20
2	Research work	720	24
1)	Undergraduate research work, including the implementation of the master's thesis	720	24
3	Additional types of training		
4	Final attestation	240	8
1)	Registration and defense of a master's thesis	240	8
	Total	3600	120

Appendix 1. Academic calendar

Appendix 1 to the Academic Calendar

Approved by the Academic Council of the NJSC "S.Seifullin KATIUS", Protocol №16, of 26.05.2023 y.

Schedule of the educational process for the 2023-2024 academic year for the educational program of the Faculty of "Forestry, Wildlife and the Environment"

MASTER

Courses	September					October					November				December				January					February				Mart				April				May					June				July					August			
	28	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26
	1	8	15	22	29	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30
		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**
MI33 "Forestry. Educational program 7M08301 - "Forest park, direction"																																																						
I	PW	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/TP	/TP	/TP	/TP	E/P	E/P	H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	RP	RP	RP	RP	RP	RP	E/P	E/P	TD/P/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H	H	H
II		/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	E/P	H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	RP	RP	RP	RP	RP	RP	FE	FE	FE	FE	FE	FE	FE								
MI33 "Forestry. Educational program 7M08301 - "Forest park, direction" (Winter reception - 2023)																																																					
I		/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H																																	
II																							/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	U	RP	RP	RP	RP	RP	RP	E/P	E/P	TD/P/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H	H	H
MI33 "Forestry. Educational program 7M08301 - "Forest park, direction" (Winter reception - 2024)																							/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/TP	/TP	/TP	/TP	E/P	E/P	TD/P/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H	H	H
MI33 "Forestry. Educational program 7M08307 - " Sustainable management of natural resources"																																																					
II		/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	М/И	М/И	М/И	М/И	М/И	НМ	E/P	E/P	H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	RP	RP	RP	RP	FE	FE	FE	FE	FE	FE								
MI33 "Forestry. Educational program 7M08304 - "Rational use of natural biological resources"																																																			
I	PW	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/TP/U	/TP/U	/TP/U	/TP/U	E/P	E/P	PD/P/R	S/RP	S/RP	S/RP	S/RP	H/S	H/S	H	H	H	H	H	H	H	H
MI33 "Forestry. Educational program 7M08304 - "Rational use of natural biological resources" (Winter reception - 2024)																							/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	TD/P/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H	H	H
MI34 Fish Industry. Educational program M08401 - "Intensive fish farming"																																																			
I	PW	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/TP/U	/TP/U	/TP/U	/TP/U	E/P	E/P	PD/P/R	S/RP	S/RP	S/RP	S/RP	H/S	H/S	H	H	H	H	H	H	H	H
II		/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	RP/U	FE	FE	FE	FE	FE	FE											
MI34 Fish Industry. Educational program M08401 - "Intensive fish farming" (Winter reception - 2023)																																																			
I		/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	H	H	H	H																															
II																							/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/TP/U	/TP/U	/TP/U	/TP/U	E/P	E/P	ЭД/С/И	S/RP	S/RP	S/RP	S/RP	H/S	H/S	H	H	H	H	H	H	H	H
MI34 Fish Industry. Educational program M08401 - "Intensive fish farming" (Winter reception - 2024)																							/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	/U	E/P	E/P	TD/P/H	H/S	H/S	H/S	H/S	H/S	H/S	H	H	H	H	H	H	H	H

Conventions

PW	presentation week	E	Examination sessions	S	summer semester	RP	Research practice
•	Theoretical training	P	passing FX	FE	final examination	U	undergraduate research work
TD	enrollment in disciplines	H	holidays	TP	Teaching practice		

Appendix 2. Working curriculum

WORKING CURRICULUM
For the modular education program "Intensive Fish farming"
Field of education 7M08 – Agriculture and bioresources
Direction of training 7M084 –
In specialty M134 – Fish industry
Course years 2023-2025

Module code	Module name	Discipline cycle	Discipline component	Code of subject	Subject name	Academic credits	Control in the academic period				Volume of hours							Distribution of credits per			
													including			Self-study work of Ms student with teache	Self-study work of Ms student	1 course		2 course	
							Exams	Differentiated test(practice)	Differentiated test(course paper)	Practice/SRW	Total	In-class learning	Lectures	Practice	Lab practicals			1	2	3	4
																		Number of weeks in the			
																		15	15	15	15
General modules																					
1	Social Sciences	BS	UC	PVSH 5201	Pedagogics of higher school	3	1				90.0	30.0	1/15	1/15		1/15	3/45	3.0			
2		BS	UC	PU 5201	Psychology of management	5	1				150.0	45.0	1/15	2/30		2/30	5/75	5.0			
3		BS	UC	IFN 5201	History and philosophy of science	5	2				150.0	45.0	1/15	2/30		2/30	5/75		5.0		
4		BS	UC	PP 5201	Pedagogical training	2					60.0								2.0		
5	Foreign languages	BS	UC	IYaP 5201	Foreign language (professional).	5	1				150.0	45.0		3/45		2/30	5/75	5.0			
6		BS	ES	AYaDAC	English for Academic Purposes	5	3				150.0	45.0		3/45		2/30	5/75			5.0	
7		BS	ES	OPP 6207	Basics promvyslovogo prediction		3				150.0	45.0		3/45		2/30	5/75				
Modules of specialty/education programm																					
8	Bioproductivity of	AS	UC	BPVUIGVB	Biological productivity of reservoirs and sustainable use of genetic fund of living aquatic	6	1				180.0	60.0	2/30	2/30		2/30	6/90	6.0			
9		AS	UC	TPAG 6302	Theory and practice acclimatization hydrobionts	5	3				150.0	45.0	1/15	2/30		2/30	5/75			5.0	
10	Hydrology and bioresources	AS	UC	ITVVR 5304	Ichthypatoology and toxicology of inland waters of the Republic of Kazakhstan	5	2				150.0	45.0	1/15	2/30		2/30	5/75		5.0		
11		BS	ES	ONIRH 5203	Organization of scientific researches in fishery	5	1				150.0	45.0	1/15	2/30		2/30	5/75	5.0			
12		BS	ES	UUVB 5205	Sustainable management of living aquatic resources		1				150.0	45.0	1/15	2/30		2/30	5/75				
13		BS	ES	GEPVR 5204	Hydrobiology and freshwater ecology of the Republic of Kazakhstan	5	1				150.0	45.0	1/15	2/30		2/30	5/75	5.0			
14		BS	ES	TPVK 5206	Toxicology of freshwater Kazakhstan		1				150.0	45.0	1/15	2/30		2/30	5/75				
15	Biotechnology in aquaculture	AS	UC	ITA 5306	Innovative technologies in aquaculture	6	2				180.0	60.0	2/30	2/30		2/30	6/90		6.0		
16		AS	UC	BVORK 5302	Biotechnics of sturgeon cultivation in Kazakhstan	6	2				180.0	60.0	2/30	2/30		2/30	6/90		6.0		
17		AS	UC	IP 5303	Research practice	5					150.0								5.0		
18		AS	UC	SPRR 6301	Selection of breeding work in fish farming	5	3				150.0	45.0	1/15	2/30		2/30	5/75			5.0	
19		AS	UC	IP 6303	Research practice	5					150.0									5.0	
20		AS	UC	IP 6305	Research practice	10					300.0										10.0
Scientifically research																					
21	Research work of a master's student	RW	CS	NIRMVMD	Undergraduate research work, including the implementation of the master's thesis.	1					30.0							1.0			
22		RW	CS	NIRMVMD	Undergraduate research work, including the implementation of the master's thesis.	1					30.0								1.0		
23		RW	CS	NIRMVMD	Undergraduate research work, including the implementation of the master's thesis.	10					300.0									10.0	
24		RW	CS	NIRMVMD	Undergraduate research work, including the implementation of the master's thesis.	12					360.0										12.0
Total of theoretical course						66	13	0	0	0	3810	615	210	405	0	375	990				
AC	**Additional courses**					46								1380.0							
PP	Teaching practice					2		2		2				60							
RP	Research practice					20		2, 3, 4		4				600							
MSSR	Undergraduate research work, including the implementation of the master's thesis.					24				1, 2, 3,				720							
FA	**Final attestation**					8								240.0							
	Master dissertation defence					8				4				240							
	Total					120					4050	615	210	405	0	375	990				

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	Short description of the discipline (30-50 words)	Number of credits	Generated learning outcomes					
				ON1	ON2	ON3	ON4	ON5	ON6
Cycle of base requirements University component									
1	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 Kazakhstan. Professional development of lecturer. The process of education in high school. The purpose of education as a pedagogical problem. The staff as a form of functioning of the integral pedagogical process. Management of pedagogical process.	3	V					
2	Psychology of management	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. Staff rotation. Certification and staff turnover.	5	V					
3	History and philosophy of science	As a result of studying the discipline "History and Philosophy of Science" graduate student should possess the ability to apply the acquired knowledge about the structure and functions of scientific knowledge, the methods of science in their professional activities; distinguished ideological, political, religious build on scientific concepts. Knowledge of tools and methods of modern science is a prerequisite for independent creative scientific work and to distinguish genuine from pseudo-scientific work constructions.	5	V					

4	Foreign language (professional)	Language for professional and academic purposes at an advanced level, which will allow to freely operate with the scientific and conceptual apparatus of the specialty, expand the scientific and information base, master the skills of interpreting scientific information, argumentation, persuasion, scientific controversy, academic writing	5		V				
Cycle of base requirements Electives component									
5	English for Academic Purposes/ Fundamentals of fishing forecasting	***English for special purposes:*** in-depth study of a foreign language and to carry out foreign language interpersonal and intercultural communication with native speakers ***Fundamentals of fishing forecasting.*** The discipline studies the biological resources of the oceans and seas and other water sources, the structure and functions of fishing, the zoning of the World Ocean, the influence of abiotic factors on the distribution and behavior of fishing objects, the problems of commercial oceanology, fishing forecasting in the World Ocean and other bodies of water.	5		V				
6	Hydrobiology and freshwater ecology of the Republic of Kazakhstan/ Toxicology of freshwater Kazakhstan	***Hydrobiology and freshwater ecology of the Republic of Kazakhstan***. The discipline studies life in water bodies, explores the patterns of existence of populations of aquatic organisms and biotic communities (biocenoses) in their inseparable connection with the habitat (biotope), which serves as a theoretical basis for preserving and ensuring the reproduction of biological resources of the hydrosphere. ***Toxicology of freshwater Kazakhstan.*** The discipline studies the characteristics of various fresh waters, biochemical indexing of toxic effects on fish, toxic substances of wastewater and their effect on the body, heavy metals and their compounds.	5			V V		V V	
7	Organization of scientific researches in fishery / Sustainable management of living aquatic resources	The discipline studies research planning, organization of field observation and expeditionary visits in fisheries and environmental studies, organization of laboratory, experiment, rules of design and writing a scientific article, implementation of research results (patent, certificate of authorship). ***Sustainable management of living aquatic resources.*** The discipline studies the mechanisms of effective management of aquatic biological resources and their conservation in fisheries and aquaculture, to ensure sustainable development and food security.	5			V V	V		

Cycle of profession requirements University component									
8	Selection of breeding work in fish farming	The discipline studies breeding and breeding work, which has different goals and characteristics, and is carried out in different categories of fish farms	5				V		V
9	Biological productivity of reservoirs and sustainable use of genetic fund of living aquatic resources	The discipline studies the basic laws of formation and transformation of energy and organic matter in aquatic ecosystems, the preservation and rational use of water resources in specially protected natural areas	6			V		V	
10	Innovative technologies in aquaculture	The discipline studies the use of reservoirs for obtaining useful biological products - fish, shellfish, crustaceans, rotifers, protozoa, algae, etc. organisms by artificial reproduction and feeding; problems of obtaining additional biological products from various aquatic environments in Kazakhstan.	6				V		V
11	Biotechnics of sturgeon cultivation in Kazakhstan	The discipline studies the improvement of biotechnology in artificial reproduction of sturgeon populations in Kazakhstan based on the constructive working scheme of the neuroendocrine regulation of their reproduction, methods of biotechnology of the main stages of artificial plant reproduction of fish based on a combination of environmental and hormonal factors.	6				V		V
12	Ichthypatoology and toxicology of inland waters of the Republic of Kazakhstan	The discipline studies the general patterns of pathological processes, establishes the general features of their occurrence, development and outcome, patterns of reactions of aquatic organisms of various systematic. position (from bacteria to fish) and different levels of organization (from cell to community, ecosystem) on the toxic effects of the aquatic environment	5						V
13	Theory and practice acclimatization hydrobionts	The discipline studies the characteristics of many species of fish used for introductions both in production and for experimental purposes, the effectiveness of acclimatization measures according to the following gradations: fishing effect, biological effect, feeding effect, negative effect.	5						V