

Ministry of Education and Science of Ukraine
Sumy National Agrarian University
Biological and technological faculty
Department of feed technology and animal feeding

Work program (syllabus) of the educational component
Aquaculture of artificial and natural water bodies (required)
It is implemented within the framework of **the Aquaculture educational program**
in specialty **204 - Technology of production and processing of animal husbandry products**
at the second (master's) level of higher education

Sums - 2024

Developer: O.B., Kyselov associate professor of the department of feed technology and animal feeding

Considered, approved and approved at the meeting of the Department of Feed Technology and Animal Feeding	protocol from " <u>06</u> " <u>06</u> 2024 year No. <u>10</u>
	Head department <u></u> Viktor OPARA (signature) (surname, initials)

Agreed:

Guarantor of the educational program **Viktoriia VECHORKA**

Dean Biology and Technology **Viktoriia VECHORKA**

Review of the work program (attached) provided:

V. Popsuy
(surname)

Igor Rubtsov
(surname)

Methodist of the Education Quality Department, licensing and accreditation

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Registered in the electronic database: date: 14.08 2024.

Information on viewing the work program (syllabus):

The academic year in which the changes are made	The number of the annex to the work program with a description of the changes	The changes were reviewed and approved		
		Date and number of the protocol of the meeting of the department	Head of Department	Guarantor of the educational program

1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

	The name is OK	Aquaculture of artificial and natural reservoirs					
	Faculty/department	Biological-technological /Technology of fodder and animal feeding					
	The status is OK	mandatory					
	Program/Specialty (programs), the component of which is OK for						
	OK can be offered for	204 Technology of production and processing of animal husbandry products 207 Aquatic biological resources and aquaculture					
	NRK level	seventh					
	Semester and duration of study	1, semester, 15 weeks					
	Number of ECTS credits	5					
	The total number of hours and their distribution	Contact work (class)					
		Lectures		Practical/seminar		Independent work	
		daytime	extramural	daytime	extramural	daytime	extramural
		30	-	30	-	-	90
	Language of education	Ukrainian					
	Teacher/Coordinator of the educational component	Oleksandr Kyselov					
11.1	Contact Information	Associate Professor of the Department of Feed Technology and Animal Feeding office 322 of the main building email _ address: Kyselov.SNAU@ukr.net consultations: every Tuesday 14 :00-15: 00 .					
	General description of the educational component	The discipline involves the study of the organizational structure of pond fisheries, their zonal placement, stocking of ponds and the main technological processes of pond aquaculture, namely: obtaining young of the main subjects of the economy in artificial freshwater reservoirs, fish farming. young to the viable stage, cultivation of fish planting material and its overwintering, cultivation of commercial fish taking into account the types and systems of farms, forms and cycles of their management, and for each of them a scheme is given. Also, the use of natural reservoirs for fishing, the cultivation of hydrobionts in controlled natural conditions, the rational management of aquaculture in rivers, lakes and reservoirs, on the coast of the seas (especially in estuaries and bays), the peculiarities of reproduction and cultivation. Economically valuable					

		<p>hydrobionts were studied by creating optimal conditions for their intensive development and growth . Mastering knowledge of technological requirements for the use of artificial reservoirs for fish farming purposes, general characteristics of fishery use of reservoirs, biotechniques and technological methods of purposeful formation of industrial ichthyofauna and cultivation of hydrobionts in controlled conditions on the base these water bodies.</p>
	<p>The purpose of the educational component</p>	<p>Educational component:</p> <ul style="list-style-type: none"> - aimed at training highly qualified specialists for the cultivation of hydrobionts on the basis of natural reservoirs for fish farming purposes; - aimed at mastering the amount of knowledge related to the technological requirements related to the use of natural water bodies for fishing purposes ; - allows students of higher education to form a theoretical base and practical skills for the successful mastering of processes related to the technology of reproduction and cultivation of cultivated fish farming objects in stands and industrial fish farms, taking into account their organizational structure and arrangement. <p>The educational component is aimed at achieving professional program competencies , which is realized through disciplinary learning outcomes, in particular the ability to apply knowledge and understanding of the chemical composition and classification of natural waters, the temperature regime of water bodies, water oxidizability , pH , biogenic content, methods of influencing the chemical composition and gas regime of water in natural and artificial reservoirs, the use of natural waters and the actual processes of water purification in the management of aquatic biological resources and aquaculture facilities, as well as the ability to plan and organize the technological processes of growing, keeping and breeding fish in various types of reservoirs and control the preservation and quality of products from them .</p>
	<p>Prerequisites for studying OK, connection with other educational components of OP</p>	<p>The educational component is based on the educational components "Aquaculture production technology"</p>
	<p>Policy of academic integrity</p>	<p>The policy of academic integrity at SNAU is governed by the Code of Academic Integrity http://docs.snau.edu.ua/documents/education/quality/kodeks_akadem_dobrochesnosti.pdf In accordance with it, the requirements for the student to observe academic integrity during the study of the educational component are as follows: to be responsible for one's duties, to fulfill the tasks prescribed by the educational program on time and in good faith; to be present at all classes; perform independent work; honestly and responsibly prepare for current, modular and final control; submit for assessment only self-made work.</p>

		<p>It is unacceptable for a student to: show a disrespectful and incorrect attitude towards the teacher; being late for classes and missing them without valid reasons; during the educational process, use hints, other people's work, telephones; provide and receive assistance from third parties during current, modular and final control; receive or offer a bribe for receiving any benefits in educational activities.</p> <p>For violating the rules of academic integrity, students may be held liable for the following forms of responsibility:</p> <ul style="list-style-type: none"> - repeated assessment (test, exam, credit, etc.); - repeated completion of the training course; - warning; - issuing a reprimand; - expulsion from the university (Part 5 of Article 48 of the Law of Ukraine "On Education");
	Link to the course in the Moodle system	https://cdn.snau.edu.ua/moodle/course/view.php?ID=5711

2. LEARNING RESULTS UNDER THE EDUCATIONAL COMPONENT AND THEIR RELATIONSHIP WITH PROGRAM LEARNING OUTCOMES

Study results for OK: After studying the educational component, the student is expected to be able to...	Program learning outcomes, to be achieved by the OK (indicate the number according to the numbering given in the OP)		How RND is estimated
	PRN 11	PRN 12	
DRN 1. To carry out the classification and practical use of lakes and reservoirs of internal natural reservoirs according to their location, sources of water supply and technical parameters.	h		Individual task, intermediate certification, final exam
DRN 2. To calculate the density of fish landing in natural reservoirs of various types according to the indicators of the development of the natural forage base and the intensity of the use of fisheries measures.		h	Individual task, final exam
DRN 3. To be able to carry out the organizational structure and arrangement of industrial fish farms.	h	h	Individual task, intermediate certification, final exam
DRN 4. To be able to breed and grow thermophilic objects and cold-water fish species in industrial farms	h	h	Individual task, intermediate certification, final exam

CONTENTS OF THE EDUCATIONAL COMPONENT (COURSE PROGRAM)

Topic. List questions that _ will be considered within the topic	Distribution within the general time budget <i>Correspondence form</i>			Recommended Books –
	Auditory work		SRS	
	Lk	Pz		
Topic 1. Basics of aquaculture of freshwater natural reservoirs. 1. General characteristics of inland fishing reservoirs of Ukraine. 2. Fishery classification of lakes. 3. Basics of integrated use of rivers, lakes and reservoirs	2	2	6	1, 2, 3, 4, 5
Topic 2. Objects of fish farming in rivers, lakes and reservoirs. 1. General requirements for objects.	2	2	6	1, 2, 3, 4, 5

<p style="text-align: center;">Topic.</p> <p style="text-align: center;">List questions that _ will be considered within the topic</p>	<p style="text-align: center;">Distribution within the general time budget</p> <p style="text-align: center;"><i>Correspondence form</i></p>			<p style="text-align: center;">Recommended Books</p> <p style="text-align: center;">–</p>
	<p style="text-align: center;">Auditory work</p>		<p style="text-align: center;">SRS</p>	
	<p style="text-align: center;">Lk</p>	<p style="text-align: center;">Pz</p>		
2. The main types of fish for breeding.				
<p style="text-align: center;">Topic 3. Fishing activities on internal natural reservoirs.</p> <p>1. Classification of fisheries activities.</p> <p>2. Technological requirements for users of water bodies of complex purpose in conducting fish farming.</p>	2	2	6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
<p style="text-align: center;">Topic 4. Enterprises for the reproduction of fish stocks in natural reservoirs.</p> <p>1. Spawning - breeding fish farms.</p> <p>2. Fish farms.</p>	2	2	6	1, 2, 3, 4, 5, 8, 12, 13
<p style="text-align: center;">Topic 5. The technology of obtaining planting material of industrially valuable semi-passive and freshwater fish species in the conditions of spawning and rearing fish farms and fish nurseries.</p> <p>1. Methods of stimulating the maturation of sexual products in breeders of various fish species</p>	2	2	6	1, 2, 3, 4, 5, 7, 10
<p style="text-align: center;">Topic 6. Fish farming technology in small reservoirs .</p> <p>1.</p>	2	2	6	1, 2, 3, 4, 5, 7, 11
<p style="text-align: center;">Topic 7. Basics of mariculture</p> <p>1. The role of mariculture in providing food to mankind.</p> <p>2. Types of mariculture farms and principles of their functioning.</p> <p>3. General characteristics of the main objects of mariculture</p>	2	2	6	1, 2, 3, 4, 5
<p style="text-align: center;">Topic 8 . Abiotic and biotic factors in industrial aquaculture.</p> <p>1. The role of abiotic factors in fish farming in industrial farms.</p> <p>2. The role of biotic factors in fish farming in industrial farms.</p>	2	2	6	1, 2, 3, 4, 5, 9, 14
<p style="text-align: center;">Topic 9. Requirements for water sources and methods of water preparation in industrial fish farms.</p> <p>1. Requirements for water sources for industrial farms.</p> <p>2. Methods of water preparation in industrial fish farms.</p>	2	2	6	1, 2, 3, 4, 5, 7
<p style="text-align: center;">Topic 10. Organizational structure and arrangements aquarium fish farms industrial type.</p>	2	2	6	1, 2, 3, 4, 5, 6,

Topic. List questions that _ will be considered within the topic	Distribution within the general time budget <i>Correspondence form</i>			Recommended Books –
	Auditory work		SRS	
	Lk	Pz		
1.				7, 8, 9, 10
Topic 11. Characteristics of feed raw materials for the production of dry combined feed. 1. Components of plant origin. 2. Components of animal origin. 3. Components of microbial origin. 4. Fat additives. 5. Vitamins. 6. Mineral substances and impurities.	2	2	6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Topic 12. Technology of production and preparation of compound feed. 1. Technology of compound feed production. 2. Technology of compound feed preparation	2	2	6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Topic 13. Breeding and growing thermophilic objects industrial fish farming Technology of carp cultivation in industrial farms. 1. The formation of repair-maternal herds of carp in gardens and pools . 2. Production of carp offspring in industrial thermal water farms. 3. Cultivation of carp fish planting material. 4. Cultivation of commercial carp in gardens and pools	2	2	6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Topic 14. Breeding and growing cold water species fish in industrial farms _ Technology of reproduction and cultivation of rainbow trout in industrial farms. 1. The formation of the brood stock of trout and the technology of progeny production.	2	2	6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Topic 15. Cultivation of industrial aquaculture facilities in closed water supply cycle installations. 1. Peculiarities of water treatment in installations with a closed water supply cycle. 2. Technology of growing carp and trout stocking material in UZV.	2	2	6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
That's all	30	30	90	

4. TEACHING AND LEARNING METHODS

DRN	Teaching methods (work to be carried out by the teacher during classroom classes, consultations)	Number of hours	Study methods (what types of educational activities should be performed by the student independently)	Number of hours
DRN 1	Educational lecture (narration, explanation, demonstration, illustration) Practical lesson (explanation, demonstration)	16	Working with lecture notes, working with books, working with regulatory and legal acts, generalization, systematization, deepening of the material, calculations, development of a civil protection plan	24
DRN 2	Educational lecture (narration, explanation, demonstration, illustration) Practical lesson (explanation, demonstration)	12	Working with lecture notes, working with books, working with regulatory and legal acts, generalization, systematization, deepening of the material, calculations	18
DRN 3	Educational lecture (narration, explanation, demonstration, illustration) Practical lesson (explanation, demonstration)	20	Working with lecture notes, working with books, working with regulatory and legal acts, generalization, systematization, deepening of the material, calculations	30
DRN 4	Educational lecture (narration, explanation, demonstration, illustration) Practical lesson (explanation, demonstration)	12	Working with lecture notes, working with books, working with regulatory and legal acts, generalization, systematization, deepening of the material, calculations	18

5. EVALUATION BY THE EDUCATIONAL COMPONENT**5.1. Diagnostic assessment (specified as necessary)****5.2. Summative assessment**

5.2.1. To assess the expected learning outcomes, it is provided

No	Methods of summative assessment	Points / Weight in the overall assessment	Compilation date
1.	Individual task from Topics 1-3.	10 points / 10%	1 semester, 3 week
2.	Individual task from Topics 4 - 7.	10 points / 10%	1 semester, 7 week
3.	Presentation, report.	5 points / 5%	1 semester, 7 week
4.	Intermediate attestation: controller	15 points / 15%	1 semester, 8 week
5.	Individual task from Topics 8 - 10.	10 points / 10%	1 semester, 10 week
6.	Individual task from Topics 11 - 13.	10 points / 10%	1 semester, 13 week
7.	Individual task from Topics 14 - 15	10 points / 10%	1 semester,

			<i>115 week</i>
8.	The exam is a multiple choice test.	30 points / 30%	1st semester, examination session

5.1.2. Evaluation criteria

Component	Unsatisfactorily	Satisfactorily	Fine	Perfectly
Individual task from Topics 1 - 3	<i><6 points</i>	<i>6-7 points</i>	<i>7-9 points</i>	<i>9-10 points</i>
	Task requirements not met	Most of the requirements have been met, but there are no separate calculations, no analysis of the received data	All requirements of the task have been fulfilled	All requirements of the task were fulfilled, critical thinking, thoughtfulness was demonstrated, laboratory equipment was used
Individual task from Topics 4 - 7	<i><6 points</i>	<i>6-7 points</i>	<i>7-9 points</i>	<i>9-10 points</i>
	Task requirements not met	Most of the requirements have been fulfilled, but some issues have not been fully disclosed, there is no analysis of the received data	All requirements of the task have been fulfilled	All the requirements of the task were fulfilled, the ability to critically evaluate various sources of information, thoughtfulness was demonstrated, suggestions were made for the use of the received data
Presentation, report	<i><1 points</i>	<i>1-3 points</i>	<i>3-4 points</i>	<i>4-5 points</i>
	Task requirements not met	Most of the requirements have been met, but there are no separate calculations, no analysis of the received data	All requirements of the task have been fulfilled	All the requirements of the task were fulfilled, the ability to critically evaluate various sources of information, thoughtfulness was demonstrated, suggestions were made for the use of the received data
Intermediate certification	<i><9 points</i>	<i>9-13 points</i>	<i>13-14 points</i>	<i>14-15 points</i>
	Fewer than 6 correct answers to a test question	6-7 correct answers to the test questions	8 correct answers to the test questions	9-10 correct answers to the test questions
Individual task from Topics 8 - 10	<i><6 points</i>	<i>6-7 points</i>	<i>7-9 points</i>	<i>9-10 points</i>
	Task requirements not met	Most of the requirements have been met,	All requirements of the task have been met, fluency in the	All the requirements of the task were fulfilled, the ability

		but some questions are incompletely disclosed, the student does not fully master the material	material has been demonstrated	to critically evaluate various sources of information, thoughtfulness was demonstrated, proposals were made to use the received data in production
Individual task from Topics 11 - 13	<6 points	6-7 points	7-9 points	9-10 points
	Task requirements not met	Most of the requirements have been met, but there are no separate calculations, no analysis of the received data	All requirements of the task have been fulfilled	All the requirements of the task were fulfilled, the ability to critically evaluate various sources of information, thoughtfulness was demonstrated, suggestions were made for the use of the received data
Individual task from Topics 14 - 15	<6 points	6-7 points	7-9 points	9-10 points
	Task requirements not met	Most of the requirements have been fulfilled, but some issues have not been fully disclosed, there is no analysis of the received data	All requirements of the task have been fulfilled	All the requirements of the task were fulfilled, the ability to critically evaluate various sources of information, thoughtfulness was demonstrated, proposals were made to use the received data in production
Exam	<20 points	20-23 points	24-26 points	27-30 points

5.2. Formative assessment

To assess the current progress in learning and understand the directions for further improvement is provided

No	Elements of formative assessment	Date
1.	Oral survey after studying the topics	At the next practical session after the presentation of the material on the topic
2.	Verbal feedback from the teacher while working on the calculation task during classes	During the semester
3.	Verbal feedback from the teacher after completing the calculation task	At the next class after the student has completed the assignment
4.	Verbal feedback from the teacher and students after the task presentation	Immediately after the end of the presentation

6. EDUCATIONAL RESOURCES (LITERATURE)

6.1. Basic literature

1. Andryushchenko A.I., Alimov S.I. Joint fish farming K.: Publishing center 25 of NAU, 2008. - 635 p .
2. Alimov S.I., Andryushchenko A.I. Industrial fish farming Sevastopol, UMY, 2011, 685 p .
3. Alimov S.I., Andryushchenko A.I. Sturgeon farming . K. " Oberi g ", 2008.–502p.
4. Andryushchenko A.I., Alimov S.I., Zakharenko M.O., Vovk N.I. Technologies production objects aquaculture . Higher school, K. 2006, 335 p .
5. Andryushchenko A.I., Vovk N.I. Aquaculture : education . post ibn _ K., 2015. 396 p.
6. Sherman I.M. Stavove _ fish farming - K.: Urozhai, 1994. -214 p .
7. Sherman I. M., Rylov V. G. Technology production products fish farming - K: Higher School, 2005. 351 p .
8. Sherman I.M. Stavove _ fish farming - K.: Urozhai, 1994. -214 p .
9. Grynzhhevskiy M.V., Andryushchenko A.I. etc . _ Foundations farmer's fish economy _ K.: Saint , 2000, 340 p.
10. Grynzhhevskiy M.V., Tretyak O.M. etc . _ Non-traditional objects fish farming in aquaculture of Ukraine . K.: Saint , 2001. 163 p .
11. Sherman I.M. , Krasnoshchok V.P., Pylypenko Yu.V. Fish farming . - K.: Harvest, 1992-191 p .
12. Galasun P.T., Andryushchenko A.I. etc . _ Intense fish farming K., "Harvest" 1990. 123 p .
13. Kharitonova N.M., Grynzhhevskiy M.V. etc . _ Technology growing commercial fish in ponds in polyculture . K. 1996, 16 p .
14. Baltaji R.A. Technology playback herbivores of fish in domestic ones reservoirs of Ukraine . K., 1996. 85p.
15. Andryushchenko A.I., Tretyak O.M. Technology playback big mouth buffalo on base cooling reservoirs of DRES. K.1996. 36 p.
16. Ryzhnikov A.I., Sverba V.A. etc . _ Technology growing p ilengas . K., 1996. - 16 p.
17. Kovalenko V.O. Aquaculture natural reservoir : educational pos ibnyk / V.O. Kovalenko, V.M. Shumova . - K., 2017. - 342 p.
18. Shekk P.V. Mariculture : textbook / P.V. Shekk , V.Yu. Shevchenko, A.M. Orlenko . – Kherson: Old and Plus , 2014. – 328 p.

6.2. Supporting literature

1. Legislation of Ukraine on nature protection and rational nature management: Laws of Ukraine "On the Animal World", "Water Code", "Land Code", etc.
2. Grynzhhevskiy M.V. Intensification of production of aquaculture products in inland water bodies of Ukraine / M.V. Grynzhhevsky . - K.: The world. – 2000.- 187 p.
3. Sherman I.M., Grynzhhevskiy M.V., Zheltov Yu.O. Fish feeding. K.: Higher education, 2001. -269 p.
4. I.M. Sherman Scientific substantiation of rational fish feeding. K .: Higher education. 2002.–128 p.
5. Sherman I.M., Yevtushenko M.Yu. Theoretical basics of fish farming: textbook - K.: Higher education. 2011. – 489 p. <https://www.nubip.edu.ua/>

7. Information resources

1. Aquaculture , Fisheries , & Pond Management (website) [Electronic resource]: <https://fisheries.tamu.edu/>
2. Aquaculture Methods [Electronic resource]: <https://www.seachoice.org/info-center/aquaculture/aquaculture-methods/>
3. Aquaculture Methods and Practices: A selected review [Electronic resource]: <https://www.fao.org/3/t8598e/t8598e05.htm>
4. Aquaculture: Types, Benefits and Importance (Fish Farming) [Electronic resource]: <https://www.conserve-energy-future.com/aquaculture-types-benefits-importance.php> 26
5. FarmFish [Electronic resource]: https://www.farmfish.org/?gclid=CjwKCAjw0N6hBhAUEiwAXab-TfnBqi8fYDKap6EQOdSS1TxflC08ruAALfctxlRmRXPPJhcoEB2XfxoCf_oQAvD_BwE
6. Fisheries and Aquaculture / FAO OON <https://www.fao.org/fishery/en/>
7. IntraFish : Aquaculture [Electronic resource]: <https://www.intrafish.com/aquaculture>
8. The Aquaculturists [Electronic resource]: <http://theaquaculturists.blogspot.com/>
9. The Fish Site: Aquaculture for all [Electronic resource]: <https://thefishsite.com/>
10. Worldwide aquaculture [Electronic resource]: <http://worldwideaquaculture.com/>

Appendix 1

Review of the work program (syllabus)

The parameter by which the work program (syllabus) of the educational component is evaluated	So	No	Comment
Learning outcomes for the educational component (DRN) correspond to the NRC			
The results of the study by the educational component (DRN) correspond to the prescribed PRN (for mandatory OKs)			
Learning outcomes by educational component provide an opportunity to measure and evaluate the level of their achievement			

OP project team member _____
 (signature) (title) (surname)

The parameter by which the work program (syllabus) of the educational component is evaluated	So	No	Comment
General information about the educational component is sufficient			
The results of the educational component correspond to the NRC			
The results of the study in the educational component correspond to the prescribed national educational			

requirements (for mandatory OKs)			
Learning outcomes by educational component provide an opportunity to measure and evaluate the level of their achievement			
Learning outcomes relate to students' competencies , not the content of the discipline (contain knowledge, abilities, skills, and not the topics of the discipline's curriculum)			
Educational activity (teaching and learning methods) enables students to achieve the expected learning outcomes			
The educational component involves learning through research			
The assessment strategy within the educational component is in accordance with University/faculty policy			
The provided assessment methods make it possible to assess the degree of achievement of learning outcomes by educational component			
The workload of students is adequate to the volume of the educational component			
Recommended learning resources are sufficient to achieve learning outcomes			
The literature is relevant			

Reviewers (in the department teacher) _____

(signature)

(title)

(position, full name)