MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY NATIONAL AGRARIAN UNIVERSITY

Department Technologies of fodders and animal feeding

"APPROVED"

Chair of department TFAF

_____Bondarenko Yu. V.

“_____”_____2020.

WORKING DISCIPLINE PROGRAM

Experiment in animal breeding

(code and title of discipline)

Specialty: 204 – Technology of production and processing of livestock products

Educational program: 204 – Technology of production and processing of livestock products

Educational degree: doctor philosophy

Faculty: Bio-technology

2020 – 2021

Working program on discipline **« Experiment in animal breeding»** for competitors for D. Ph. Degree on subject area 204 «Technology of production and processing of livestock products»

Elaborator: c. a. s, associate professor _____**Opara V.O.**

Working program was considered at the meeting of department Technologies of fodders and animal feeding

Minutes No_12___ dated 5th of June 2020._____

Chair of department TFAF _____Yu.V. Bondarnko

Approved:

Guarantor of educational program _____ (L.M. Khmelnychy)

Postgraduate study department chair _____ ( )

1. Description of the subject

<table>
<tr><td rowspan="2">Names of indexes</td><td rowspan="2">Area of knowledge, specialization, educational and qualification level</td><td>Characteristics of discipline</td></tr>
<tr><td>Full-time tuition</td></tr>
<tr><td rowspan="2">Number of credits – 3</td><td>Field of study:
20 Agrarian Sciences and Foodstuffs_</td><td rowspan="2">normative</td></tr>
<tr><td>Subject area:
204 – Technology of production and processing of livestock products
(code and title)</td></tr>
<tr><td>Modules – 3</td><td rowspan="6"></td><td>Academic year:</td></tr>
<tr><td>Content modules: 3</td><td>2020-2021</td></tr>
<tr><td rowspan="3"></td><td>Course</td></tr>
<tr><td>1</td></tr>
<tr><td>Semester</td></tr>
<tr><td>Total number of hours – 90</td><td>1</td></tr>
<tr><td rowspan="10">Weekly hours for full-time education:

class-room work – 5
Individual work of a student – 6</td><td rowspan="10">Educational degree:
Doctor of philosophy</td><td>Lectures</td></tr>
<tr><td>24</td></tr>
<tr><td></td></tr>
<tr><td>Practical, seminars</td></tr>
<tr><td>16</td></tr>
<tr><td>Laboratory</td></tr>
<tr><td>-</td></tr>
<tr><td>Individual work</td></tr>
<tr><td>30</td></tr>
<tr><td></td></tr>
<tr><td>Individual tasks:</td></tr>
<tr><td>20</td></tr>
<tr><td>Form of control:
Exam</td></tr>
</table>

Comment.

Ratio of a number of hours of classroom training to self-organized and individual work is (%):

Full-time tuition - 44/56

2. Aim and tasks of the subject

Aim: The purpose of discipline studying is formation of knowledge and skills in the methodology of zootechnical experiments, systematization, analysis and evaluation of research results, design of scientific work.

Tasks: The main tasks of discipline studying are theoretical and practical training of candidates for the degree of Doctor of Philosophy on: the essence of concepts and categories of research methodology; organization of scientific research process in animal husbandry, research methods, its content and principles of development; development of stages and forms of the research process; organization of research work of post-graduate students; registration of research results and their implementation in practice.

Learning results:

To know: modern methods, techniques and methodologies for research on the organization of production and processing of livestock products, methods of statistical processing of research results using information technologies, equipment, research and experiment equipment and technical means for conducting research with biological objects of livestock.

To be able to: perform, analyze and critically evaluate the results of experimental work with biological objects of livestock, interpret the results of research on changes in production conditions and technologies, maintain approved documentation, conduct scientific research to solve problems during production and processing of livestock products.

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3. The discipline program

Content modul 1. ***Scientific research in agricultural production. Methodology and methods of scientific research in various fields of animal husbandry.***

TOPIC 1. Scientific and technological progress and its importance in the development of animal husbandry. Scientific potential of the Ukrainian Agrarian Academy of Agrarian Sciences and organization of research activity in Ukraine. Stages of formation and development of research in different historical epochs. The main directions of modern research in animal husbandry and poultry breeding.

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Topic 2. Methodological fundamentals of scientific research. Observation and systematization as a method of scientific research. Production experiment. Scientific research by setting experiments (zootechnical experiments). Research of biological processes. Research of production processes and operations..

Content modul 2. ***Methods of conducting and analysis of the results of zootechnical experiments.***

Topic 3. Methods of setting zootechnical experiments.

Methods of separate groups. Methods of integral groups (methods of factorial analysis). Methods of periods and parallel group-periods. Replacement methods. Methods of the Latin square. Research by the assessment of the hereditary and constitutional factors of productivity. General methodological criteria for conducting experiments in animal husbandry.

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Topic 4. Study of nutrition and digestibility of fodders and metabolism. Estimation of fodder nutrition. Setting of experiments on the study of fodder digestibility. General scheme of experiments for metabolism study. Differential experiments for studying of fodder digestibility.

Topic 5. Research of meat and dairy productivity. General principles for studying meat productivity of farm animals. Study of dairy productivity of cattle. Study of pig and poultry meat productivity.

Topic 6. Methodology of special research. Extensive evaluation of the exterior type of dairy and dairy-meat cows. Methodology of molecular genetic research. Research of farm animal behavior.

Topic 7. Systematization, analysis and evaluation of experimental results. Biometric processing and analysis of research results. Calculation of economic efficiency of scientific developments.

Content modul 3. ***Information support and approbation of scientific research*****.**

Topic 8.Dissertation work of the doctor of philosophy - as qualification research. The essence of dissertation, its structure. Requirements for dissertation of a doctor of philosophy. Technology of dissertation preparation. Requirements for design of scientific work. Preparation of writing and design of research work.

Topic 9. Approbation of research results and forms of implementation of research results.

Approbation and publication of research results. Implementation of results and effectiveness of scientific research.

4. Structure of the subject

Names of content modules and topics	Number of hours						
		Full-time					
	Total	including					
		l	lab	p	ind	i.w.	
1	2	3	4	5	6	7	
Module 1. Planning and technique of conducting zoo-technical experiment							
Content modul 1. ***Scientific research in agricultural production. Methodology and methods of scientific research in various fields of animal husbandry.***							
Topic 1. Scientific and technological progress and its importance in the development of animal husbandry.	6	2		-		4	
Topic 2. Methodological fundamentals of scientific research.	8	2		2		4	
Total of content modul 1	**14**	**4**		**2**		**8**	
Module 2. .Methods of conducting and analysis of the results of zootechnical experiments.							
Content modul 2. ***Methods of conducting and analysis of the results of zootechnical experiments.*** **.**							
Topic 3. Methods of setting zootechnical experiments	16	4		4		8	
Topic 4. Study of nutrition and digestibility of fodders and metabolism	2	2					
Topic 5. Research of meat and dairy productivity.	2	2					
Topic 6. Methodology of special research.	8	2		2		4	
Topic 7. Systematization, analysis and evaluation of experimental results	6	2		4			
Total of content modul 2	**34**	**12**		**10**		**12**	
Module 3. Essence of dissertation work, its structure.							
Content modul 3. ***Information support and approbation of scientific research*****.**							
Topic 8. Dissertation work of the doctor of philosophy - as qualification research.	12	4		4		4	
Topic 9. Approbation of research results and forms of implementation of research results	10	4		-		6	
Total of content modul 3	**22**	**8**		**4**		10	
Total hours	**70**	**24**		**16**	**-**	**30**	
INHT	**20**				**20**		
Total hours	**90**	**24**		**16**	**20**	**30**	

5. Topics and plan of lectures

№	Topic name	Number of hours
1.	**Topic 1. Scientific and technological progress and its importance in the development of animal husbandry.** Plan. Scientific potential of the Ukrainian Agrarian Academy of Agrarian Sciences and organization of research activity in Ukraine. Stages of formation and development of research in different historical epochs. The main directions of modern research in animal husbandry and poultry breeding..	2
2.	**Topic 2. Methodological fundamentals of scientific research.** Plan**.** Observation and systematization as a method of scientific research. Production experiment. Scientific research by setting experiments (zootechnical experiments). Research of biological processes. Research of production processes and operations	2
3.	**Topic 3. Methods of setting zootechnical experiments.** Plan. Methods of separate groups. Methods of integral groups (methods of factorial analysis). Methods of periods and parallel group-periods.	2
4.	**Topic 4. Methods of setting zootechnical experiments.** Plan. Replacement methods. Methods of the Latin square. Research by the assessment of the hereditary and constitutional factors of productivity. General methodological criteria for conducting experiments in animal husbandry.	2
5.	**Topic 5. Study of nutrition and digestibility of fodders and metabolism.** Plan. Estimation of fodder nutrition. Setting of experiments on the study of fodder digestibility. General scheme of experiments for metabolism study. Differential experiments for studying of fodder digestibility.	2
6.	**Topic 6. Research of meat and dairy productivity** Plan. General principles for studying meat productivity of farm animals. Study of dairy productivity of cattle. Study of pig and poultry meat productivity.	2
7.	**Topic 7. Methodology of special research..** Plan. Extensive evaluation of the exterior type of dairy and dairy-meat cows. Methodology of molecular genetic research. Research of farm animal behavior	2
8.	**Topic 8. Systematization, analysis and evaluation of experimental results.** Plan. Biometric processing and analysis of research results. Calculation of economic efficiency of scientific developments.	2
9.	**Topic 9. Dissertation work of the doctor of philosophy - as**	2

	qualification research. Plan. The essence of dissertation, its structure. Requirements for dissertation of a doctor of philosophy.	
10.	**Topic 10. Dissertation work of the doctor of philosophy - as qualification research..** Plan. Technology of dissertation preparation. Requirements for design of scientific work. Preparation of writing and design of research work.	2
11.	**Topic 11. Approbation of research results and forms of implementation of research results.** Plan. Approbation and publication of research results. Implementation of results and effectiveness of scientific research.	2
12.	**Topic 12. Implementation forms of scientific research results.** Plan. Implementation of results and effectiveness of scientific research.	2
	Total	**24**

6. Topics of practical classes

№ з/п	Names of topics	Number of hours
1	**Planing of zootechnical experiments.** Plan Studying the rules for choosing a topic and setting research objectives. Justification of the experiment setting. Writing a review abstract. Construction of a working hypothesis.	2
2	**Compilation of methodology and working plan of the experiment** Plan Development and approval (approbation) of experimental methods. Formation of a group of experimental animals	2
3	**Maintaining scientific documentation** Plan Composing acts on setting up experiments. Identification of animals and conducting of measurements. Accounting of animal productivity	2
4	**Selection of biological material for research and rules of work with animals.** Plan Selection and preparation of blood samples for analysis. Selection of milk (colostrum) samples for analysis. Selection of urine samples for research.	2
5	**Biometric processing and analysis of research results** Plan Entering the results of measurements, accounting in systemic tables, their analysis. Processing of digital material using a computer program. Calculation of average values of variability of traits, level of difference probability, correlation coefficients, inheritance and repeatedness.	4

6	**Execution of research work** Plan Execution of research work. Design of sections, tables, bibliography	4
	Total	**16**

7. Independent work (full-time)

Independent work of students during the study of the discipline involves the development of a theoretical course on lecture notes, basic and additional literature, preparation for the defense of practical tasks, studying of materials from current edition of zoo-technical and special literature on the recommendation of the teacher.

№	Topic title	Number of hours
1	TOPIC1. Scientific and technological progress and its importance in the development of animal husbandry.	4
2	Topic 2. Methodological fundamentals of scientific research. The concept and typology of research methods. The essence, purpose, functions of scientific experiment. Scientific forecasting as a research method: content, main types and technologies of implementation.	4
3	Topic 3. Research on the assessment of hereditary and constitutional factors of productivity. General methodological criteria for conducting experiments in animal husbandry.	4
4	Topic 4. Methods of setting zoo-technical experiments. Study of fodder digestion in fistula and intact animals. Studying with usage of incubation substances invitro. Research of the basic metabolic processes and their metabolites.	4
5	Topic 5. Study of wool productivity of sheep. Research methods in horse breeding. Methodology of scientific research in fish farming. Setting experiments on bees. Setting experiments in rabbit breeding. Setting experiments in fur farming. Setting experiments on laboratory animals.	4
6	Topic 6. Execution and defense of the dissertation. Literature abstracting. Selection and substantiation of the topic, development of its content, selection and development of research methods, conducting scientific research, approbation of research results in the practice of research objects. Registration and accounting of research topics	4
7	Topic 7. Preparation of research materials for open publication. The essence of reports at the conference. Report form (message), summary of the speech. Construction of the report: issues, presentation of main material, conclusions. Preparation for the performance, highlights. Publication of the report in international, all-Ukrainian and regional	4

	collections of conference abstracts.	
8	Topic 4. Information support of scientific research. Types of information sources. Rules for compiling a bibliographic description for a list of references. Rules for quoting and bibliographic references in the texts of scientific papers.	2
	Total	**30**

8. Individual tasks – 20 scores

1. Composing methodology for conducting experiments on farm animals in accordance with dissertation topic of post-graduate student.

Topics of individual tasks for graduate students:

1. Compose a methodology of scientific and economic experiment on the following topic: "Effectiveness of the use of high-protein feed additives while growing of weaned piglets". Research should be conducted by the method of balanced groups. Develop an experimental scheme and plan the study of necessary zoo-technical indicators.

2. Develop methodology and scheme of experiment for studying of rapeseed meal effect on the reproductive qualities of sows when introducing it into the fodder concentrate instead of barley meal. The experiment should be conducted by the method of group-periods with repeated substitution

3. Formulate research objectives, develop research methods and schemes on the topic "Introduction of nanocomposite materials into innovative technologies for incubation of chicken eggs." Research should be carried out by the method of group-analogues and plan the account of necessary zoo-technical indicators.

4. Compose methodology of experiment conducted by the method of mini-herd on the following topic: "Comparative assessment of exterior of the first-born cows of dairy breeds under conditions of dairy complex." Develop experimental scheme.

5. Develop methodology and scheme of the experiment on the topic: "Fattening productivity of hybrid young pigs of domestic and foreign origin". The experiment is carried out by the method of group-analogues.

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Consultations on theoretical course of the discipline are provided to students according to the schedule of the department, regulated by pedagogic workload, as well on the necessity and are intended to assist students in successful mastering the theoretical course.

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9. Training methods

1. Learning methods by source of knowledge:

1.1. **Verbal:** story, explanation, lecture, briefing, work with a book (writing, planning, reviewing, summarizing, supporting notes, etc.).

1.2. **Наочні**: **Visual:** demonstration, observation..

1.3. **Практичні**: **Practical:** laboratory method, practical work, production and practical methods.

2. Methods of learning by the nature of logic perception.

2.1. Analytical

3. Methods of learning by the nature and level of graduates' independent mental activity.

3.1. Partial search (heuristic)

3.2. Research

3.5. Explanatory and demonstrative

4.**Active methods of learning:** use of technical means of training, training on the production, group research, self-assessment of knowledge, use of training and control tests, use of basic lecture notes and others)

5. Interactive learning technologies: use of multimedia technologies, electronic tables.

6. Personalized learning

7. Differentiated instructing

8. Learning through inquiry.

10. Control methods

1. Rating control on 100-point ECTS rating scale

2. Multi-criteria evaluation of current work of postgraduates:

- level of knowledge demonstrated at practical, laboratory and seminar classes;
- activity during the discussion of issues raised in the class;
- results of laboratory work execution and protection;
- express control during classes;

- self-study of the whole topic or individual issues;

Credit-module system is used for activation of class and independent work of postgraduates. It foresees differentiation of educational material in the form of assessment in points according to different components of content modules of the discipline. At the end of semester, credit is passed orally with maximum score of 100 points. A group of teachers carries out the assessment.

11. Distribution of scores received by graduate students

Current testing and independent work					**Total for moduls and IWS**	**exam**	**Sum**
Content modul 1 0-20 scores		**Content modul 2 0-20 scores**	**Content modul 3 0-15 scores**	**I W S**			
T1	**T2**	**T3-T7**	**T8-T9**	**15**	70 **(55+15)**	**30**	**100**
10	**10**	**20**	**15**				

Grading scale: national and ECTS

Total scores for all the educational activities	**ECTS**	**National scale**	
		For examination	**For credit**
90 – 100	**A**	excellent	credit
82-89	**B**	good	
74-81	**C**		
64-73	**D**	satisfactory	
60-63	**E**		
35-59	**FX**	Unsatisfactory with the possibility of reexamination	No credit with the possibility of reexamination

0-34	**F**	unsatisfactory with obligatory re-learning of the course	No credit with obligatory re-learning of the course

13. Recommended literature

№	Kind	Title
1	**Basic**	Brizhko V.M. Patent science as independent scientific discipline. - K .: Nat. Information Agency under the President of Ukraine, 2006. - 184 p
2		Viktorov P.I., Menkin V.K. Methods and organization of zoo-technical experiments. - M .: Agropromizdat, 2001. - 112 p.
3		Ovsyannikov A.I. Fundamentals of experimental work in animal husbandry. - M .: Kolos, 2006. – 303p.
4		Klymenko M.O., Feshchenko V.P., Vozniuk N.M. Fundamentals and methodology of scientific research. - Kyiv, Agrarian Education 2010. – 350 p.
5		Kononenko V.K. and others. Workshop on the fundamentals of scientific research in animal husbandry. - K., 2000. - 96 p
6		François Lachapelle. 2009. Guide for the ethical evaluation of experiments using laboratory animals. Gircor groupe interprofessionnel de réflexion et de communication sur la recherche. N*ational Charter on the ethics of animal experimentation. 60* *https://www.recherche-animale.org/sites/default/files/guide_for_the_ethical_evaluation_of_experiments_using_laboratory_animals.pdf*
7		Michael F. W. Festing and Douglas G. Altman. 2002. Guidelines for the Design and Statistical Analysis of Experiments Using Laboratory Animals. *ILAR Journal*, Volume 43, issue 4 , 244-258. *http://www.3rs-reduction.co.uk/assets/applets/Festing_Altman.pdf*
8		National Advisory Committee for Laboratory Animal Research, Guidelines for Institutional Animal Care and Use Committee, Singapore.
9		National Advisory Committee for Laboratory Animal Research, The Guiding Principles for the Care and Use of Animals for Scientific Purposes, Singapore.
10	Additional	Merkurieva E.K. Biometrics in selection and genetics of farm animals.- M .: Kolos, 2001. - 423 p.
11		Plohinsky N.A. Manual on biometrics for zoo-technicians.- M .: Kolos, 2009. - 225 p.
12		Dolan, K, 2000, Laboratory Animal Law, Blackwell Science, London, UK
13		National Health and Medical Research Council, 2004. Australian Code of Practice for the Care and Use of Animals for Scientific Purposes (7th edn.), Australia.

14. Information resources

1. http://www.abelavida.com/shop/agromach
2. http://www.agro-id.gov.ua
3. http://www.lol.org.ua
4. http://www.minagro.gov.ua
5. http://www.ukragroportal.com
6. http://www.zooinformatika.narod.ru/ssyl.html