NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Department of Genetics, Breeding and Biotechnology of Animals

«APPROVED»

Dean of the Faculty of Veterinary Medicine
Doctor of Veterinary Sciences, Professor
_____ Микола ЦВІЛІХОВСЬКИЙ
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«____»_____ 2024 р.

«APPROVED»

at a meeting of the Department of Genetics, Breeding and Biotechnology of Animals

Protocol №11 from 17 of April 2024 p

Head of Department
Doctor of Agricultural Sciences, Professor
_____ Сергій РУБАН
(Sergey RUBAN)

«CONSIDERED»

Guarantor of the program

Doctor of Veterinary Sciences, Professor
_____ Наталія ГРУШАНСЬКА
(Natalia HRUSHANSKA)

CURRICULUM WORK PROGRAM

FUNDAMENTALS OF ANIMAL BREEDING

Branch of knowledge	*21* Veterinaria
Specialty:	211 – «Veterinary medicine»
Educational program:	«Veterinary medicine»
Faculty:	Veterinary medicine
Developer:	Iryna SUPRUN, Candidate of Agricultural Sciences, Associate Professor of Genetics, Breeding and Biotechnology of Animals

Kyiv - 2024

Description of the discipline Fundamentals of animal breeding

Field of knowledge, specialty, educational program educational level		
Educational level	*Master*	
Specialty	*211* «Veterinary medicine»	
Educational program	Veterinary medicine	
Characteristics of the discipline		
Kind	*Required*	
Total hours	120	
Amounts of credits ECTS	4	
Amount of content modules	2	
Course project (work)	-	
Form of control	Test	
Indicators of academic discipline for full term and reduced period of studying		
	Full term of study	Reduced period of studying
Year of study (course)	*2*	*2*
Semester	*3*	*3*
Lectures	*15*	*15*
Practical, seminar classes	-	-
Laboratory classes	*30*	*15*
Independent work	*75*	*90*
Individual tasks	-	
Amount of weekly classroom hours for full-time education	*3 hours*	*2 hours*

1. Purpose, tasks and competencies of the discipline

The purpose is to acquaint future specialists with the objects of their professional work, namely: biological features of different types of agriculture. animals, their individual development, patterns of growth in different age periods, the nature and magnitude of productivity depending on physiological and technological factors, methods of breeding and selection, their impact on animal health and susceptibility to disease. The acquired knowledge will allow the veterinarian to take into account zootechnical factors in the treatment of various types of agriculture. animals.

The task is to prepare future veterinarians for preventive and curative measures, taking into account the specifics of agriculture. animals and technologies of various branches of animal husbandry.

As a result of studying the discipline the students have to

know: biological features of different types of agriculture animals, patterns of their growth and development at different ages, constitution and exterior, interior, breeding methods, selection, selection, as well as evaluation of breeders for the quality of offspring, the impact of selection on life and health, the consequences of inbreeding and heterosis.

be able: assess the constitution and body parts of the exterior, determine the direction of animal productivity, breed, type of constitution, condition, susceptibility to disease, estimate productivity, determine the density of inbreeding, breeding value of animals.

Acquisition of competencies:

General Competences (GC). As part of the effects of final competence acquired in the learning process, graduates are able to:

GC10. communicate with representatives of other professional groups of different levels (with experts in other fields of knowledge / types of economic activity);

Professional (special competencies) (SC).

SC 2. The ability to use tools, special devices, laboratory equipment and other technical means to carry out the necessary manipulations during professional activity.

SC 10. Ability to develop strategies for safe, sanitary animal keeping. As part of the effects of final competence acquired in the learning process, graduates are able to be aware of the details of the decisions made, in particular regarding natural resources.

Program learning outcomes (PLO):

PLO 3. Determine the essence of physical and chemical, a biological processes that occur in the body of animals in normal and pathological conditions.

PLO 7. Formulate conclusions regarding the effectiveness of selected methods and means of keeping, feeding and treating animals, prevention of contagious and non-communicable diseases, as well as production and technological processes at enterprises for keeping, breeding or exploiting animals of various classes and species.

PLO 10. Propose and use expedient innovative methods and approaches to solving problematic situations of professional origin.

2. The program and structure of the discipline

- for full-time study

Names of content modules and topics	Amount of hours												
	Full-time							Correspondence form					
	weeks	total	including					weeks	including				
			lec	p	lab	iv	ip		lec	p	lab	iv	ip
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Content module № 1. ***Breed. Exterior. Interior. Constitution. Ontogenesis. Productivity***													
Topic 1 Introduction. The concept of the subject. The doctrine of breed. Identification system in animal husbandry.	1	8	2		2		2						
Topic 2 Constitution, exterior, interior of agriculture animals.	2-3	10	2		4		4						
Topic 3 Individual development of agricultural animals.	3	16	2		2		12						
Topic 4 Agricultural animals' productivity	4-5	18	2		4		12						
In total by the content module 1		50	8		12		30						
Content module 2. ***Pedigrees. Tribal value. Selection and breeding methods. Inbreeding. Heterosis. Features of selection and breeding of animals***													
Topic 1. Methods of agricultural animals' breeding. Breeding work in the herd.	7-8	18	2		4		12						
Topic 2. Breeding value of animals. The technique of compiling	9-10	18			8		10						

individual and group pedigrees.													
Topic 3. Theoretical and practical foundations of rejection and selection.	11 - 12	16	1		6		10						
Topic 4. Biological features and breeds of cattle and horses.	13 - 14	8	2				6						
Topic 5. Biological features and breeds of poultry, pigs and sheep.	15	8	2				7						
In total by the content module 2		70	7		18		45						
Total hours	-	120	15		30		75						
Educational practice _____ _____ _ (if available in the working curriculum)		30	25	-	-		5		-	-	-		-
Total hours	-	150	40		30		80						

3. Topics of laboratory classes

№	Name of topics	Amount of hours
1	Identification system in animal husbandry	2
2	Exterior of animals	2
3	Exterior assessment methods	2
4	Methods of accounting and estimation of animal growth	2
5	Accounting and evaluation of milk productivity	2
6	Accounting and evaluation meat productivity	2
7	Breeding methods. Crossing. Technique of drawing up crossing schemes	4
8	Estimation of breeding value of animals by origin	8
9	Inbreeding. Technique of estimation of inbreeding coefficient	6
	In total	30

4. Independent work under the guidance of lecturer

№	Name of topics	Amount of hours
1.	Study of the identification system in animal husbandry	2
2.	Estimation of exterior of animals	4
3.	Determination of absolute, average daily and relative grows gain	12

4.	Milk productivity evaluation per lactation	2
5.	Meat productivity evaluation	2
6.	Evaluation of the productivity of various types of animals: pigs, sheep, poultry, horses	8
7.	Drawing up crossing schemes	12
8.	Construction of different types of pedigrees	10
9.	Estimation of inbreeding coefficient	10
10	Preparation of abstracts or presentations about breeds of cattle, horses, sheep, pigs.	12
11	Testing	1
	In total	75

- for reduced period of studying

Names of content modules and topics	**Amount of hours**												
	Full-time							**Correspondence form**					
	weeks	total	including					weeks	including				
			lec	p	lab	iv	ip		lec	p	lab	iv	ip
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Content module № 1. ***Exterior. Interior. Constitution. Breed. Ontogenesis. Productivity***													
Topic 1 Introduction. The concept of the subject. The doctrine of breed. Identification system in animal husbandry.	1	11	2				9						
Topic 2 Constitution, exterior, interior of agriculture animals	2-3	13	2		2		9						
Topic 3 Individual development of agricultural animals.	3	11	2		1		8						
Topic 5 Agricultural animals' productivity	4-5	18	2		2		14						
In total by the content module 1		53	7		5		40						
Content module 2. ***Pedigrees. Tribal value. Selection and breeding methods. Inbreeding. Heterosis. Features of selection and breeding of animals***													

Topic 1. Methods of agricultural animals' breeding. Breeding work in the herd.	6-7	14	2		2		10						
Topic 2. Breeding value of animals. The technique of compiling individual and group pedigrees.	8-9	16			4		12						
Topic 3. Theoretical and practical foundations of selection, rejection and selection.	10-11	17	2		3		12						
Topic 4. Biological features and breeds of cattle and horses.	12-13	10	2				8						
Topic 5. Biological features and breeds of poultry, pigs and sheep.	14-15	10	2				8						
In total by the content module 2		67	8		9		50						
Total hours	-	120	15		15		90						
Educational practice _____ _____ _ (if available in the working curriculum)		30	25	-	-		5		-	-	-		-
Total hours	-	150	40		15		95						

3.1. Topics of laboratory classes

№ з/п	Name of topics	Amount of hours
1	Exterior of animals. Exterior assessment methods	2
2	Methods of accounting and study of animal growth	1
3	Accounting and evaluation of dairy, meat and other types of productivity	2
	Breeding methods. Crossing. Technique of drawing up crossing schemes	2

4	Estimation of breeding value of animals by origin	4
5	Inbreeding. Technique of estimation of inbreeding coefficient	3
7	Test	1
	In total	**15**

4.1. Independent work under the guidance of lecturer

№ з/п	Name of topics	Amount of hours
1.	Study of the identification system in animal husbandry	9
2.	Estimation of exterior of animals	9
3.	Determination of absolute, average daily and relative grows gain	8
4.	Accounting for milk productivity per lactation.	2
5.	Meat productivity accounting.	2
6.	Evaluation of the productivity of various types of animals: pigs, sheep, poultry, horses	10
7.	Drawing up crossing schemes	10
8.	Construction of different types of pedigrees	12
9.	Estimation of inbreeding coefficient	12
10	Preparation of abstracts or presentations about breeds of cattle, horses, sheep, pigs.	16
	In total	**90**

5. Means of diagnosing learning outcomes:

- **exam;**
- **module tests.**

Questions for detailed answers and interviews at the exam:

1. The origin of different species of farm animals and poultry.
2. The concept about breed. The structure of the breed and methods of its maintenance.
3. Classification of breeds of animals.
4. Features of breeds and which factors determining their formation.
5. Tasks which should be solved by exterior estimation.
6. Estimation of the exterior of animals by measurements and indices.
7. Colorings, signs and marks of animals.
8. Methods of farm animal's exterior estimation.
9. Production and zootechnical accounting. Methods of identification in animal husbandry.
10. Domestication changes of farm animals.
11. Classification of types of constitution according to P.M. Kuleshov and MF Ivanov, their characteristics.
12. Sexual and economic maturity. Terms of sexual and economic maturity of farm animals.
13. Methods of studying the growth of farm animals. Absolute, average daily and relative gains using in animal husbandry. Calculation formulas.
14. Characteristics of the condition of farm animals.
15. Critical points of farm animals breeding. The main forms of underdevelopment of farm animals.
16. Characteristics of the period of embryonic development of farm animals, its duration in animals of different species.
17. Factors that determine the productivity of farm animals.

18. Estimation of sheep by wool productivity.
19. Estimation of agricultural birds productivity.
20. Methods of estimation of dairy productivity. Calculation of the average% of fat (protein) in milk per lactation, the amount of milk fat (protein), kg.
21. Methods of estimation of meat productivity of animals.
22. Estimation of horses by working qualities.
23. Estimation of reproductive quality of sows.
24. Determining the density of inbreeding by Shaporuzh and Wright-Kislovsky.
25. Classification of inbreeding by degree of closeness.
26. Methods of breeding in animal husbandry.
27. Describe the main breeds of pigs. Hybridization in pig breeding.
28. Accounting and estimation of reproductive capacity of sows.
29. Hybridization in animal husbandry. Tasks, which could be solved by hybridization.
30. Pedigrees and their importance in animal breeding.
31. Rules and techniques for drawing individual pedigrees.
32. Classification of pedigrees.
33. Rules and techniques for drawing group pedigrees.
34. Genotypic selection parameters (selection effect, selection rate).
35. Define the concepts: selection, breeding.
36. The efficiency of selection in different environmental conditions. Features of selection of laboratory animals' selection.
37. Forms and methods of selection.
38. Stages of selection (sequence, direction).
39. Inbreeding depression and heterosis. Terms of inbreeding using.
40. Principles of selection. Classification of selection options. Forms of the heterosis effect expression.
41. Describe the main biological characteristics and features of breeding and selection of cattle.
42. Describe the main biological characteristics and features of breeding and selection of pigs.
43. Describe the main biological characteristics and features of breeding and selection of horses.
44. Describe the main biological characteristics and features of breeding and selection of sheep.
45. Describe the main biological characteristics and features of breeding and selection of poultry.
46. Describe the main breeds of meat productivity cattle.
47. Describe the main breeds of sheep. Production classification of sheep.
48. Describe the main breeds of dairy productivity cattle.
49. Describe the main breeds of horses.

6. Teaching methods

1. According to the source of knowledge (verbal, visual and practical methods);
2. At the appropriate stage of training, each of which solves specific tasks (focus on methods of preparing learners to study material that involves the awakening of interest, cognitive needs, updating basic knowledge, necessary skills and abilities; on learning methods new material, methods of concretization and deepening of knowledge, acquisition of practical skills that contribute to the use of knowledge, methods of monitoring and evaluation of learning outcomes);
3. According to the method of directing educational activities direct or indirect (methods of explaining the teacher and various methods of organizing independent work of students);
4. By the logic of the educational process (reliance on inductive and deductive, analytical and synthetic methods);

5. For didactic purposes - methods of organizing the activities of those who are taught, methods of stimulating the activities of encouragement and other methods of verification and evaluation.

7. Evaluation methods:

7.1. Exam;

7.2. Oral survey;

7.3. Modular testing;

7.4. Individual projects;

7.4.1. Build individual pedigrees according to the individual number in the list, workshop "Breeding of agricultural animals "or by the ETC on the elearn platform.

7.4.2. Build group pedigrees according to the individual number in the list, workshop "Breeding of agricultural animals "or by the ETC on the elearn platform.

7.4.3. Calculate the inbreeding rate according to the individual number in the list, workshop "Breeding of agricultural animals "or by the ETC on the elearn platform.

7.4.4. Build an exterior profile according to the individual number in the list, workshop "Breeding of agricultural animals "or by the ETC on the elearn platform.

7.4.5. Calculate the absolute, relative and average daily increments of agriculture. animals according to the individual number in the list, workshop "Breeding of agricultural animals "or by the ETC on the elearn platform.

7.5. Protection of laboratory and practical works;

7.6. Presentations and speeches at scientific events.

8. Distribution of points received by students

Modular rating system of teaching students and assessing their knowledge of the discipline "Fundamentals of Animal Breeding" provides:

in the working curriculum in one semester.

Lectures - 15 hours

Laboratory classes - 30 hours

Independent work - 75 hours

After studying the discipline - control of knowledge in the form of a test.

The duration of the semester is 15 weeks.

According to the total number of hours, the estimated rating of the discipline is.

Rдис = Rнр + Rат

Ratings for educational work (Rнр) and certification (Rат) determined by the following ratios:

Rнр - the rating on academic work is 70% of the number of points of the rating on the discipline;

Rат - rating on certification is 30% of the number of rating points in the discipline.

Given the volume of the structure of the program material of the discipline, we divide it into 2 content modules.

The real rating of a student in academic work is determined by the points obtained by the formula:

$$\mathbf{Rнр = 0{,}70 \times ((R_1 \times 2 + R_2 \times 2)/4 = 4 \text{ (number of credits)}}$$

For example, if a student scored 60 points from the 1st module, 60 points from the 2nd - the total is:

$$\mathbf{0{,}70 \times (60 \times 2 + 60 \times 2) / 4 = 42}$$

For example, if a student scored 60 points from the 1st module, 60 points from the 2nd - the total:

1. Table of distribution of assessment points for the implementation of different types of training

activities from each module and the "weight" of each module in the overall rating

Types of educational activities	Distribution of evaluation points	"Weight" of each module in the overall rating,%
Educational work		70
Module 1	100	50

Module 2	100	50
Final certification	30	30
Test	30	x

Assessment of student knowledge is on a 100-point scale and is translated into national assessments according to table. 1 "Regulations on examinations and tests in NULES of Ukraine" (order of entry into force of 03.03.2021№ 7). To determine the rating of the student (listener) for mastering the discipline $\mathbf{R_{ДИС}}$ (up to 100 points) the received rating on attestation (up to 30 points) is added to the rating of the student (listener) on educational work $\mathbf{R_{НР}}$ (up to 70 points): $\mathbf{R_{ДИС} = R_{НР} + R_{АТ}}$.

2. Correlation between higher education rating and national grades

Rating of higher education seekers, points	**National assessment for the results of compilation**	
	exams	**tests**
90 – 100	**Perfectly**	**Credited**
74 – 89	**Fine**	
60 – 73	**Satisfactorily**	
0 – 59	**Not satisfactorily**	**Not credited**

The result is recorded in the student's record book according to table 2.

9. Methodical support

1. A working curriculum for the discipline "Fundamentals of Animal Breeding" has been developed
2. **Electronic training course "Fundamentals of Animal Breeding"https://elearn.nubip.edu.ua/course/view.php?id=116 Автор курсу Супрун І.О.**

Recommended literature
Basic literature

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2. Розведення сільськогосподарських тварин / М.З. Басовський, В.П. Буркат, Д.Т. Вінничук та ін. — Біла Церква: БДАУ, 2001. — 400 с.
3. **Супрун І.О. Основи розведення тварин: Робочий зошит. Методичні рекомендації для лабораторних і самостійних робіт студентів ОС «Магістр» за спеціальністю 211 «Ветеринарна медицина» / І.О. Супрун. — К.: НУБіП України, 2024. — 158 с.**
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Supporting literature

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3. Гопка Б.М., Павленко П.М. Конярство. — К.: Урожай, 1991.
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6. Іовенко В.М. Вівчарство України. — К.: Аграрна наука, 2017.
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