MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
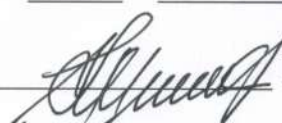
SUMY NATIONAL AGRICULTURAL UNIVERSITY

Department of breeding and selection of animals and aquatic bio-resources

THE WORKING PROGRAM OF THE SYLLABUS

Herd management

Specialty: 204 – "Livestock production and processing technologies of animal products"

Educational program: 204 – "Livestock production and processing technologies of animal products"

Degree: Ph.D.

Faculty: Biology and Technology

2020 – 2021 academic year

Syllabus on the **"Herd management"** for applicants ED Doctor of Philosophy in specialty 204 – "Livestock production and processing technologies of animal products"

Developer: Head of the department of breeding and selection of animals and aquatic bioresources, Doctor of Agricultural Sciences,

Professor _____ **L.M. Khmelnychyi**

Syllabus approved at the meeting on the Department of breeding and selection of animals and aquatic biological resources:

protocol from "*26*" _____*05*_____ 2020 year № *19*

Head of the department _____ **L. M. Khmelnychyi**

Approved:

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

Head of postgraduate and doctoral studies _____ (Лукашова І.В

1. Description of the syllabus

Name of indicators	Field of knowledge, direction of training, educational degree	Characteristic of the syllabus	
		full-time education	evening form of education
Quantity of credits – **5,0**	Field of knowledge: 20 – agricultural sciences and food	*Selective*	
Modules – **2**	Specialty: 204 – livestock production and processing technologies of animal products	*Training period*:	
Content modules: **3**		2020-2021	
Individual research task:		**Course**	
		2	
		Semester	
Total number of hours: **150**		4 (s)	
		Lectures	
	Educational degree: **Ph.D.**	20 hours	
		Practical	
		30	
		Laboratory	
Weekly hours for full-time study: classroom – **5** independent work of the student – **10**			
		Independent work	
		85 hours	
		Individual tasks: 15 hours	
		Type of control:	
		exam	

Note. The ratio of the number of class hours to independent and individual work is: 33,3/66,6

2. The aim and tasks of syllabus

Purpose: to provide students with theoretical knowledge and practical skills on issues, the main forms of breeding accounting and statistical reporting in livestock, pigs, sheep, horse breeding and poultry, existing automated accounting systems in dairy farming, algorithm for forming a database of selection information, printing existing grading of forms of breeding accounting, system of identification and registration of cattle, methods of evaluation of animals on leading economically useful features, system of selection of sires, statistical processing of data of selection and operative information, grading of cows and repair young stock with subsequent drawing up of the consolidated report on its results, system of identification of animals, in the conditions of loose keeping to use a method of formation of technological groups.

The graduate student must learn to use automated information systems to form a database of breeding information, plan and monitor the implementation of technological operations related to the physiological cycle and condition of animals, analyze the structure and physiological state of the herd, predict events in the herd, select sires and analyze their use on the productivity of offspring and reproductive capacity.

Calculate a consolidated report on the results of cattle breeding, form on paper all forms of reporting of breeding records, officially approved by the Ministry of Agrarian Policy and Food of Ukraine, fill in registration cards, movement information and books of identified animals in accordance with "Identification and registration of animals."

Objectives: to learn to use automated information systems to form a database of selection information, plan and monitor the implementation of technological operations related to the physiological cycle and condition of animals, analyze the structure and physiological state of the herd, predict events in the herd, select breeders and analyze their use offspring and reproductive capacity, calculate a consolidated report on the results of grading of different species of animals, form on paper all forms of breeding records officially approved by the Ministry of Agrarian Policy and Food of Ukraine, fill in registration cards, movement information and books of identified animals in accordance with "Identification and registration of animals."

3. Program of the syllabus

Is being tested. Considered at a meeting of the department.
Protocol № 19, from   "26" 05   2020 y.

Module 1. Automation of zootechnical and breeding accounting and the use of information systems in animal breeding

Content module 1. Organization of an automated information system for selection in breeding herds using PC software

Topic 1. *Automation of zootechnical and breeding accounting in animal husbandry and its significance for selection work.* Definition of terms, importance of zootechnical and breeding accounting in selection and breeding work of farm animals. Automated production process management system. Information and technical base of ACS. Large-scale selection in animal husbandry. Existing automated accounting systems in dairy farming. Purpose and aspects of their use. Dairy Management System (IMS) "Intesel Orsek" and software complex "PlemOffice".

Selection of bulls and breeding by lines - the basis of selection in terms of effective improvement of dairy cattle. Determination of the degree of inbreeding and genetic similarity in the process of attachment to a herd of sires. Cattle exterior.

Topic 2. *Automated information system of selection (AIS) of dairy cattle. Features of evaluation of cows on economically useful traits.* A brief historical aspect of the creation of AIS. International Corporation of Business Machines. The system of breeding and evaluation of animals in dairy farming in accordance with world standards. The system of selection work in the countries of the European Union. Tasks of large-scale selection of dairy cattle. Evaluation of cows on milk productivity. The role of the World Organization for the Standardization of Identification, Accounting and Evaluation of Farm Animals (ICAR). Evaluation of cows on milk productivity. Features of reproduction in dairy cattle breeding.

Method of linear classification of dairy cows and dairy-meat breeds by type. Linear evaluation of Simmental cows by exterior type.

Content module 2. *Zootechnical and breeding accounting in cattle and pig breeding*

Topic 3. *Basic provisions for keeping records of the main herd and repair of young animals.* The procedure for drawing up acts of acceptance of long-term biological assets of livestock. Registration of formation of the main herd of animals. Acts of acceptance of long-term biological assets of animal husbandry. Acts on write-off of long-term biological assets of animal husbandry (culling of animals). The order of transfer of animals to the main herd. The order of posting offspring. Registration of disposal of animals and poultry as a result of slaughter, cutting and death. Acts on the transfer of animals from group to group within the current biological assets. The order of transfer of animals from group to group.

Methods for assessing the growth and development of animals.

Topic 4. *Zootechnical and breeding accounting in livestock and pig breeding.* Zootechnical and breeding records in dairy and dairy-meat cattle breeding. Technological map of selection and zootechnical operations. Determination of indicators that characterize the productivity of the animal. Determination of indicators that characterize the quality of milk. Completion of breeding records in dairy and dairy-meat cattle breeding. Zootechnical and breeding records in beef cattle breeding. Forms of breeding accounting in beef cattle breeding. General provisions on cattle grading. Organization of rating. Age restrictions on rating. Determination of animal breeds. Purebred and crossbred animals. The main traits in determining the class of animals. Evaluation of animals by individual qualities. Score of animals. Determination of a complex class of animals. Determination of a complex class of breeding cows. Definition of a complex class of sires. Determination of a complex class of young animals. Measures to improve breeding in the field of livestock.

Zootechnical and breeding accounting in pig breeding. The procedure for determining the indicators of breeding records. Purpose and basic provisions for filling out forms of breeding records. General provisions for grading pigs of different sexes and ages. Forms of zootechnical and breeding accounting. Numbering and marking of pigs. The order and accuracy of determining the indicators of breeding records.

The efficiency of selection animals on economically useful grounds in the system of evaluation of animals by breeding value. Breeding of cows by farm families and formation of a leading selection group of cows. Promising genealogical lines of Holstein and Swiss breeds. Rating of pigs.

Module 2. Breeding accounting, automation of herd management systems and identification of cattle

Content module 3. *Zootechnical and breeding accounting in horse breeding, sheep breeding and goat breeding*

Topic 5. *Zootechnical and breeding accounting in horse breeding, sheep breeding, poultry farming and rabbit breeding.* Numbering and marking of horses. The procedure for determining the indicators of breeding records of horses. The order of filling in the forms of pedigree registration of horses. Forms of accounting conducted at racetracks. Marking and numbering system of sheep and goats. List of forms of primary zootechnical and breeding accounting. The main provisions of filling in the forms of breeding records. General provisions on grading according to the Law of Ukraine "On Breeding in Animal Husbandry". General requirements for filling out forms of breeding records. Abbreviated designations for filling in the forms for lambskin sheep according to the rating key.

The main traits of the body structure of horses, defects, color and body structure of animals of different types. Labeling schemes for lambs of different breeds and evaluation of wool shearing. Rating of sheep. Poultry grading. Rating of rabbits.

Topic 6. *Automated control systems in dairy farming.* Electrification of dairy farms. Classification of existing systems of electrification of dairy farms. Integration of the whole farm electrification system with the help of a microcomputer. Integrated dairy

farm management system. Daily herd management. Automatic monitoring to detect hunting and control the health of cows. Milking process management. Automation of processes for determining the quality of milk and control over feeding cows.

Topic 7. *Cattle identification and registration system.* Regulations on the system of identification and registration of cattle. Procedure for identification and registration of cattle. Concepts used in the Regulations. Procedure for registration of farms. Identification of animals and their registration in farms. Slaughter, death, destruction, disposal of identified animals. Exchange of tags, passports and veterinary cards in case of loss or damage.

4. Structure of the syllabus

Names of content modules and topics	full-time					
	total	including				
		l	p	cpr	ind	i.w.
Topic 1. Automation of zootechnical and breeding accounting in animal husbandry and its significance for selection work.	22	3		5	2	12
Topic 2. Automated information system of selection (AIS) of dairy cattle. Features of cows evaluation on economically - useful traits.	22	3		5	2	12
Together with content module 1	**44**	**6**		**10**	**4**	**24**
Topic 3. Basic provisions for keeping records of the main herd and repair young animals.	21	3		4	2	12
Topic 4. Zootechnical and breeding accounting in livestock and pig breeding.	21	3		4	2	12
Topic 5. Zootechnical and breeding accounting in horse breeding, sheep breeding, poultry farming and rabbit breeding.	20	2		4	2	12
Together with content module 2	**62**	**8**		**12**	**6**	**36**
Topic 6. Automated control systems in dairy farming.	22	3		4	3	12
Topic 7. Cattle identification and registration system	22	3		4	2	13
Together with content module 3	**44**	**6**		**8**	**5**	**25**
Total hours	**150**	**20**	**-**	**30**	**15**	**85**

5. Topics and plan of lectures

№	Topic title	Number of hours
1	**Topic: Automation of zootechnical and breeding accounting in animal husbandry and its importance for breeding work.** **Plan** 1. Zootechnical and breeding accounting - the basis of breeding in animal husbandry. 2. Automated control process of production processes. 3. Large-scale selection in animal husbandry 4. Existing automated accounting systems in dairy farming. Purpose and aspects of their use.	3
2	**Topic: Automated information system of selection (AIS) of dairy cattle. Features of evaluation of cows on economically useful traits.** **Plan** 1. A brief historical aspect of the creation of AIS. 2. The system of breeding and evaluation of animals in dairy farming in accordance with world standards 3. Evaluation of cows on milk productivity. 4. Features of reproduction in dairy cattle breeding.	3
3	**Topic: Basic provisions for keeping records of the main herd and repair of young animals.** **Plan** 1. The procedure for drawing up acts of acceptance of long-term biological assets of livestock (formation of the main herd of animals)	3
4	**Topic: Zootechnical and breeding accounting in livestock and pig breeding.** **Plan** 1. Zootechnical and breeding accounting in dairy and dairy-meat cattle breeding 2. Zootechnical and breeding accounting in beef cattle breeding 3. Zootechnical and breeding accounting in pig breeding	3
5	**Topic: Zootechnical and breeding accounting in horse breeding, sheep breeding, poultry farming and rabbit breeding.** **Plan** 1. Zootechnical and breeding accounting in horse breeding 2. Zootechnical and breeding accounting in sheep breeding. 3. The main traits of the body structure of horses, defects, color and body structure of animals of different types (independent work).	3
6	**Topic: Automated control systems in dairy farming.** **Plan** 1. Electrification of dairy farms 2. Automation of the milking process	3

7	**Topic 7. Cattle identification and registration system.** **Plan** 1. Regulations on the system of identification and registration of cattle. 2. Procedure for registration of farms. 3. Identification of animals and their registration in farms. 4. Moving animals.	2
	Number of hours	**20**

6. Topics of practical classes

№	Topic title	Number of hours
1	**Topic: Automation of zootechnical and breeding accounting in animal husbandry and its significance for breeding work.** Practical work with the software package "PlemOffice". Working with the information contained in the "Breeding Cow Card" (genealogy, assessment of economically useful and breeding traits).	6
2	**Topic: Automated information system for selection (AIS) of dairy cattle. Features of evaluation of cows on economically useful traits.** Evaluation and control of milk productivity of cows. Diagnosis of pregnancy of animals. Selection - the basis of the effectiveness of selection and breeding work with the herd for the future.	6
3	**Topic: Basic provisions for keeping records of the main herd and repair of young animals.** Primary accounting of bioactive assets.	6
4	**Topic: Zootechnical and breeding accounting in livestock and pig farming.** Registration and rearing of repair young stock of dairy cattle and pigs in the AIS system.	6
5	**Topic: Zootechnical and breeding accounting in horse breeding, sheep breeding, poultry and rabbit breeding.** Forms of zootechnical and breeding accounting in horse, sheep, poultry farming and rabbit breeding. Differences and similarities. Rating of animals.	6
6	**Topic: Automated control systems in dairy farming.** Analysis of the production, reproduction and selection situation in the herd using AIS. Analysis of the selection situation of the herd using biometrics. Grading of cattle.	6
7	**Topic: System of identification and registration of cattle.** Introduction to the system of identification of cattle, which is introduced in Ukraine.	7
	Total	**30**

7. Independent work

№	Topic title	Number of hours
1	**Topic: Automation of zootechnical and breeding accounting in animal husbandry and its importance for breeding work.** **Plan** 1. Selection of bulls and breeding by lines - the basis of selection in terms of effective improvement of dairy cattle. 2. Determination of the degree of inbreeding and genetic similarity in the process of attachment to a herd of breeding sires. 3. Exterior of a cattle.	12
2	**Topic: Automated information system for selection (AIS) of dairy cattle. Features of evaluation of cows on economically useful traits.** **Plan** 1. Method of linear classification of dairy cows and dairy-meat breeds by type. 2. Linear evaluation of Simmental cows by exterior type.	12
3	**Topic: Basic provisions for keeping records of the main herd and repair young animals.** **Plan** 1. Methods for assessing the growth and development of animals.	12
4	**Topic: Zootechnical and breeding accounting in livestock and pig farming.** **Plan** 1. The efficiency of selection animals on economically useful traits in the system of evaluation of animals by breeding value. 2. Selection of cows by farm families and the formation of a leading selection group of cows. 3. Promising genealogical lines of Holstein and Swiss breeds. 4. Rating of pigs.	12
5	**Topic: Zootechnical and breeding accounting in horse, sheep, poultry and rabbit breeding.** **Plan** 1. The main traits of the body structure of horses, defects, color and body structure of animals of different types. 2. Schemes of marking lambs of different breeds and evaluation of wool shearing. 3. Appraisal of sheep. 4. Poultry appraisal. 5. Appraisal of rabbits.	12
6	**Topic: Automated control systems in dairy farming.** **Plan**	12

	1. Automation of individual distribution of concentrates in sections at loose keeping. 2. Preparation of the dairy farm for automation.	
7	**Topic: System of identification and registration of cattle.** **Plan** 1. Slaughter, death, mortality, disposal of identified animals. 2. Exchange of tags, passports and veterinary cards in case of loss or damage.	13
Total hours		**85**

8. Individual tasks

№	Topic title	Number of hours
1	Get acquainted with software complexes for cattle: "PlemOffice", "SUMS" Intesel Orsek","Uniform Agri", compare their capabilities, identify passes and disadvantages.	
2	Get acquainted with the software packages for pigs: "PlemOffice" and "1C: Enterprise. Breeding in animal husbandry. Pig breeding for Ukraine" to compare their capabilities, identify advantages and disadvantages.	
3	Get acquainted with the capabilities of the programs "Technologist" in the data collection system, "Control-2007" in the poultry system.	
Total hours		**15**

9. Teaching methods

1. Methods of learning by source of knowledge:
1.1. *Verbal*: lecture, story, explanation, heuristic conversation.
1.2. *Visual*: demonstration, illustration, observation.
1.3. *Practical*: practical work with breeding and accounting materials.
2. Teaching methods by the nature of the logic of cognition.
2.1. *Analytical*.
2.2. *Personalized learning*.
2.3. *On-demand training*.
3. Teaching methods for the nature and level of independent mental activity of graduate students.
3.1. *Problem (problem-information)*
3.2. *Partial search (heuristic).*
3.3. *Research.*
3.4. *Explanatory and demonstrative*.
4. Active teaching methods – use of technical means of training, classes, use of problem situations, excursions, classes on production, group researches, self-assessment of knowledge, simulation methods of training (built on imitation of future professional activity), use of educational and control tests, use of reference notes of lectures)

5. Interactive technologies – the use of multimedia technologies, interactive whiteboards and spreadsheets, case-study (method of analysis of specific situations), dialogue learning.

10. Control methods

1. Rating control according to the 100-point scale of ECTS assessment

2. Carrying out intermediate control during the semester (intermediate certification).

3. Polycriteria assessment of the current work of graduate students:

- the level of knowledge demonstrated in the laboratory;
- activity during the discussion of issues raised in class;
- results of performance and protection of laboratory works;
- express control during classroom classes;
- independent study of the topic as a whole or individual issues;
- performance of analytical and calculation tasks;
- writing essays;
- written assignments during tests;
- production situations.

4. Direct consideration in the final assessment of the graduate student's performance of a certain individual task:

- Scientific research work;
- educational and research work;
- educational and practical research with presentation of results, etc.

11. Distribution of credit points received by graduate students

Current testing and independent work				For modules and IWS	Exam	Total
Module 1		Module 2	IWS			
CM 1	CM 2	CM 3				
T 1-2	T 3-5	T 6-7	15	70 (**55+15**)	30	100
20	20	15				

12. Scale of assessment of full-time and evening postgraduate students: national and ECTS

Total scores for all types of educational activities	Score ECTS	Score on a national scale	
		for exam, course project (work), practice	for test
90 – 100	**A**	excellent	credited
82-89	**B**	good	
75-81	**C**		
69-74	**D**	satisfactorily	
60-68	**E**		

35-59	FX	unsatisfactory with the possibility of reassembly	unsatisfactory with the possibility of reassembly
1-34	F	unsatisfactory with mandatory re-study of the discipline	unsatisfactory with mandatory re-study of the discipline

12. Recommended literature
Basic

1. Basovskiy, N. Z. and Vlasov, V. I., 2015. Informatsionnye sistemy v selektsii zhivotnykh [Information systems in animal breeding]. Kiev: Urozhay.

2. Ladyka, V. I., Khmelnychyi, L. M., Burkat, V. P. and Ruban, Yu. D., 2010. Reiestratsiia ICAR: Dovidnyk [ICAR Registration: Reference book]. Sumy.

3. Basovskyi, M. Z., Burkat, V. P. and Vinnychuk, D. T., 2015. Breeding of farm animals. In: M. Z., Basovskyi, ed. Rozvedennia silskohospodarskykh tvaryn, Bila Tserkva.

Additional

1. Lytovchenko, A. M., Mykytiuk, D. M., Bilous, O. V., [ta in.]. 2014. Instruktsiia z bonituvannia velykoi rohatoi khudoby molochnykh i molochno-miasnykh porid [Instructions appraisal cattle and dairy cattle breeds]. Kyiv: «PPNV».

2. Bashchenko, M. I. and Khmelnychyi, L. M., 2005. Vahovi ta liniini parametry eksterieru telyts ukrainskoi chervono-riaboi molochnoi porody [Weight and linear parameters of the heifers exterior of Ukrainian Red-and-White dairy breed]. *K.: Ahrarna nauka*, issue 39, pp. 41 - 47.

3. Melnyk, Yu. F., Mykytiuk, D. M., Pyshcholka, V. A., [et.al.]. 2016. Breeding program of Ukrainian Black-and-White dairy breed of cattle for 2016-2021. In: V. P., Burkat and M. Ya., Yefimenko, ed. Prohrama selektsii ukrainskoi chorno-riaboi molochnoi porody velykoi rohatoi khudoby na 2016-2021 roky, Kyiv.

4. Burkat, V. P., Polupan, Yu. P. and Yovenko, I. V., 2004. Liniyna otsinka koriv za typom [Linear assessment of cows by type]. *Agrarian science*.

5. Khmelnychyi, L. M., Ladyka, V. I., Polupan, Yu. P. and Salohub, A. M., 2008. Metodyka liniinoi klasyfikatsii koriv molochnykh i molochno–miasnykh porid za typom [Method of linear classification of dairy cows and dairy-meat breeds by type]. *Sumy: VVP "Mriia–1" TOV*.

6. Avtomatizatsiya molochnykh ferm [Dairy farm automation]. Avaible at: http://otherreferats.allbest.ru/dl/31/00012672.zip

7. Afanasenko, M., 2007. Stado pod prysmotrom [The herd under the supervision]. AhroTekhnyka, no. 3. Avaible at: http://www.agro-technika.ru/issue/3/130/

8. Kovalenko, A. M., Kharytonova, A. H., Malshakova, S. O., [et.al.]. 2009. Accounting in agricultural enterprises. In: A. M. Kovalenko, ed. Bukhhalterskyi oblik na silskohospodarskykh pidpryiemstvakh Ukrainy. Dnipropetrovsk: VKK «Balans-Klub».

9. Havryliuk, V. M., Biriukova, O. O., Ohiichuk, M. F., [et.al.]. 2008. Accounting in agriculture in primary documents and postings. In: Ohniichuk, M. F., and V. M.,

Parkhomenko, ed. Bukhhalterskyi oblik u silskomu hospodarstvi v pervynnykh dokumentakh i provodkakh. Kh.: Faktor.

10. Instruktsiia z vedennia pleminnoho obliku v zvirivnytstvi ta krolivnytstvi [Instructions for keeping breeding records in animal husbandry and rabbit breeding]. Avaible at: http://zakon.nau.ua/doc/?code=z0993-03

12. Instruktsiia z vedennia pleminnoho obliku v molochnomu i molochno-miasnomu skotarstvi [Instructions for keeping breeding records in dairy and dairy-meat cattle breeding]. Avaible at: http://agroua.net/files/animals/catalog/info/5.DOC

13. Instruktsiia z vedennia pleminnoho obliku v molochnomu i molochno-miasnomu skotarstvi [Instructions for keeping breeding records in dairy and dairy-meat cattle breeding]. Avaible at: http://agroua.net/files/animals/catalog/info/23.doc

14. Instruktsiia z vedennia pleminnoho obliku v svynarstvi [Instructions for keeping breeding records in pig breeding]. Avaible at: http://agroua.net/files/animals/catalog/info/25.doc

15. Instruktsiia z vedennia pleminnoho obliku u vivcharstvi ta kozivnytstvi [Instructions for keeping breeding records in sheep and goat breeding]. Avaible at: http://agroua.net/files/animals/catalog/info/66.doc

16. Samsonov, V. S., 2011. Avtomatizirovannye sistemy upravleniya [Automated control systems]. M.: Vyssh. shkola.

17. Shylo, V. P., Sopko, V. V., Ilina, S. B. and Vaskov, V. N., 2016. Orhanizatsiia obliku na pidpryiemstvakh silskohospodarskoi haluzi. Navchalnyi posibnyk [Organization of accounting at agricultural enterprises]. Kyiv: Konkord.

18. Cecile Cornou. Automation Systems for Farm Animals: Potential Impacts on the Human-Animal Relationship and on Animal Welfare. September 2009Anthrozoos A Multidisciplinary Journal of The Interactions of People & Animals 22(3):213-220. DOI: 10.2752/175303709X457568

19. Hamadani H. and Khan A. A. Automation in livestock farming – A technological revolution. International Journal of Advanced Research (2015), Volume 3, Issue 5, 1335-1344.