

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE  
SUMY NATIONAL AGRARIAN UNIVERSITY**

**Department of Special Zootechnics**

**APPROVED**  
**Head of the Department**  
**“21” May 2019 p.**  
\_\_\_\_\_ **Pavlenko Yu. M.**

**ACADEMIC PROGRAM OF THE DISCIPLINE**

**Modern innovations in livestock and poultry farming**

**Specialty 204 Technology of production and processing of livestock products**

**2019 – 2020 academic year**

The academic program of the discipline *Modern innovations in livestock and poultry farming* for the postgraduates training of higher education level “Doctor of Philosophy” (Ph.D.) for specialty *204 Technology of production and processing of livestock products*.

The project team consists of:

Candidate of Agricultural Sciences,  
Associate Professor \_\_\_\_\_ Pavlenko Yu.M.

The academic program was approved by the *Department of Special Zootechnics*, “20” May 2017 (Minutes No.17)

**Head of the Department of Special Zootechnics \_\_\_\_\_ (Pavlenko Yu.M.)**

Approved:  
Dean of the faculty \_\_\_\_\_ Opara V.O.

Director of Postgraduate Department,  
Doctor of Economics, Professor \_\_\_\_\_ Lozynska I.V.

- Description of the discipline

Name of indicators	Field of study, program subject area, higher education level	Characteristics of the discipline	
		full-time education	extramural education
Amount of credits – <b>4.0</b>	Field of study: <i>0901 Agriculture and forestry</i>	<i>Selective</i>	
Modules – 4	Specialty: <i>204 - Technology of production and processing of livestock products</i>	<b>The year of training:</b>	
Content modules: 4		2019-2020-й	
		<b>year</b>	<b>year</b>
		2	2
		<b>Semester</b>	<b>Semester</b>
Total workload – 120		4 <sup>th</sup>	4 <sup>th</sup>
Hours per week for full-time education: classroom learning – 6 individual learning – 1	Higher education level: <i>Doctor of Philosophy</i>	<b>Lectures</b>	<b>Lectures</b>
		44 hours	8 hours
		<b>Practical classes, seminars</b>	<b>Practical classes, seminars</b>
		44 hours	10 hours
		<b>Laboratory works</b>	
		-	-
		<b>Individual work</b>	<b>Individual work</b>
		32 hours	102 hours
		<b>Individual assignments:</b>	<b>Individual assignments:</b>
		-	-
		Assessment: <i>credit</i>	

The ratio of classroom learning hours to individual learning ones is (%):  
for full-time education – 104/16

- **The purpose and objectives of the discipline**

**The purpose** of the discipline is postgraduates' acquisition of knowledge about modern innovations in the livestock and poultry industries abroad and in Ukraine.

**Objectives** are to provide theoretical knowledge and skills in intensive technologies of rearing young animals for herd replacement, new approaches to breeding and keeping animals, innovative technologies in livestock reproduction, as well as to be able to use innovative technologies for harvesting, storage, and distribution of feed in order to maximize the genetic potential of animals.

**Must know:** intensive technologies of production of rearing young animals for herd replacement; biological features of animals; organization of reproduction and breeding methods; innovative technologies for milk and beef production, as well as innovations in the technique of harvesting, storage, and distribution of feed.

**Must be able to** evaluate the quality of all types of feed used for animal feeding; organize the reproduction of animals and rearing young animals for herd replacement; determine the quality of milk according to the main indicators; to manage technological processes of preparation of heifers for calving and milking of first-borns; production of milk, beef, pork; evaluate biological and economic indicators in livestock and poultry.

## **PROGRAM OF THE DISCIPLINE**

**Content module 1. Innovative technologies used in the breeding and reproduction of livestock and poultry.**

**Theme 1. Introduction. Innovative technologies as progressive methods in animal husbandry.** Livestock as a branch of the national economy and agricultural production. The importance of animal husbandry in the national economy of Ukraine. The main forms of enterprises and farms engaged in the production of products of cattle, pig, poultry, and horse breeding.

**Theme 2. Intensive technologies of rearing young cattle for herd replacement.** Creation of a pedigree core on the farm. Application of progressive milk feeding schemes to calves during the milking period (foreign experience). Organization of record-keeping and control over rearing young animals. Methods of calves' disinfection. Tail docking. Weighing. Gradual training of dairy calves to eat coarse and concentrated forage. Cold method of growing calves. Individual cages for growing calves during the milk period. The effect of different levels of intensity of calves rearing during the first three months on subsequent dairy productivity during the first finished lactation period. Maintenance of production and breeding records in animal husbandry.

**Theme 3. Intensive technologies of rearing young horses for herd replacement.** Regularities of growth and development of young animals. Foals growing till weaning, supplementary feeding of lactating mares and foals. Foals weaning and growing to one year old. Control over the development of young animals. Calculations of operational control of young animals' development.

Feeding standards for pedigree and working horses and dieting in summer and winter. Pasture keeping of horses. Features of growing young draft horses.

**Theme 4. Intensive technologies of young pigs growing for replacement.** Factors determining the high stability of young animals growing for replacement. Selection, removing of the worst, evaluation of pedigree young animals and animals for replacement. Technological features of their growing. Intensification of growing pigs for replacement. The value of exercise and pasture maintenance. Norms and rations of feeding. Biological features of suckling piglets determining the technology of their growing: lack of immunity, the imperfection of the thermal regulation mechanism, high intensity of growth and metabolism. Care and maintenance of suckling piglets. Prevention of anemia and gastrointestinal diseases. Piglets' needs for nutrients and the rationale for feeding schemes. The value of early piglets' supplementary feeding, supplementary feeding schemes. Optimal technological parameters for growing piglets, prevention of losses. Weaning of piglets. The terms of weaning and their substantiation, advantages, and disadvantages. The technique for weaning piglets.

**Theme 5. Intensive technologies of incubation of farm poultry eggs.** The history of incubation. Factors affecting the incubation quality of eggs. Incubation technology. Egg incubation regimen. Evaluation of daily young poultry. Biological control of incubation. The concept of incubation regimens. Types of incubation regimens. Application of incubation regimens for different types of poultry, layout scheme. Incubator premises, types of incubators, automation of particular incubator systems. Studying technical characteristics of industrial incubators. Studying differentiated and stable incubation regimes. Scheme and schedule of laying eggs in the incubator. Methods for assessing the quality of incubation eggs. The technological process of incubation. Features of technological process in egg incubation of different types of poultry. Natural and artificial incubation of poultry eggs. Collecting, packing, transporting, grading and storing eggs. Pre-incubation processing of eggs. Requirements for the quality of incubation eggs of different species of poultry. Biological control of incubation. Calculations of production of incubation eggs and by-products from second-order reproducers.

**Theme 6. Novelties in the reproduction of cattle livestock.** Timely fertilization of cows is the way to the efficient operation of the dairy farm. Synchronization of *libido sexualis*, ovulation and insemination. Schemes of intensification of cow reproduction. Evaluation of animals to be synchronized. Organization of synchronization of *libido sexualis*. Timely introduction of the required substances according to the timetable. Insemination of cows for 2 hours before or after milking. Keeping animals after insemination. Diagnosis of pregnancy of cows and heifers. The technology of one-off cessation of milk production, or dry-off of cows. Evaluation of the reproductive capacity of cattle.

**Theme 7. Reproduction of horses.** Methods of horse reproduction. Reproduction objectives, puberty, mating age, duration of breeding use of stallions and mares. Regularities of sexual cycles, the mating season. Time-frame and methods of mating mares. Diagnosis of mare pregnancy. Care of pregnant mares. Foaling, rules of foals' naming. Methods for determining mares' *libido sexualis* by

teaser stallion. Methods of preparation of mares for pairing and technique of its conducting. Drawing up a plan for pairing and foaling of mares. Analysis of the results of farms' mares mating and foaling during the past year. Determining the efficiency of breeding stallions and mares. Guidelines for the care of pregnant mares.

**Theme 8. The technology of pig reproduction.** Preparation of sows for farrowing and its conducting. Maintenance and feeding of lactating sows. Stimulation and synchronization of sows' *libido sexualis* and farrowing. Machine types and design features. Long-term use of sows.

**Theme 9. The rearing of young birds. Diagnosis of embryonic death.** The technology of selection of the youngsters and their post-incubation treatment. Preparation for transportation of the youngsters. Assessing the quality of day-old youngsters and determining their sex. Processing, packing, and transportation of the day-old youngsters. Signs characterizing the embryo in violation of incubation regimens. Assessing the quality of day-old youngsters and determining their sex.

**Content module 2. Innovations in the production and initial processing of livestock and poultry products.**

**Theme 10. Voluntary milking of cows by milking robots under conditions of loafing, bud boxes and tethered keeping of cattle.** Principles of formation of technological groups of cows under different milk production systems. Milking-parlours "Yalynka" (Fir-tree), "Yalynka 30" (Fir-tree 30), "Yalynka 50" (Fir-tree 50) and milking parlor of rotor type. Milking parlors "Paralel" (Parallels). Milking systems "Midiline<sup>TM</sup>". Systems and methods for keeping dairy cows. Warm and cold keeping of cows. The tethering of cows. Control milking of cows. Dairy **robots**. Milk tanks. Requirements for the design and construction of dairy rooms. Artificial sources of cold. Refrigeration units used in dairy farms. Centrifugal milk purifiers that are widely used in the dairy industry. Water heaters for the heat processing of milk. Pasteurizer OPD-1M (ОПД-1М). Universal plate pasteurizers. Determination of milk quality at dairy complexes and farms.

**Theme 11. The technology of beef production in dairy cattle.**

The concept of cattle growing and feeding up. Types of farms for growing and feeding up cattle, and the procedure of completion of them with young animals. Requirements for young animals intended for growing and feeding up in ordinary and specialized farms. Characteristics of young animals feeding reared for meat in milk and post-milk periods. Keeping young animals under different systems of growing and feeding up. Organization of forage base in high-tech, ordinary farms, and agricultural enterprises.

Growing and feeding up livestock using food processing industry wastes. Organization of feeding up of adult cattle. Fattening cattle. Modeling of flow organization of the technological process of growing and feeding up young cattle. Determination of the cycle, rhythm, and front of the works. Cycle chart of livestock movement by production periods. Technological operations for different methods of keeping and fattening livestock, determining their most appropriate

technological sequence and environmental assessment. Operating and technological process maps.

Experience of the best farms of Ukraine and the world on growing and feeding up cattle. An economic evaluation of existing technological solutions for livestock breeding and fattening.

**Theme 12. The productivity of horses.** *Working productivity.* Indicators determining the productivity of horses: breed and thoroughbred, type, weight, age, level of training, adaptability, health, conditions of feeding, care, and maintenance. Working qualities of horses. Feeding, watering and keeping working horses. Types of harness, its classification. *Meat productivity.* Horse meat as a foodstuff, its chemical composition, nutrition, and dietary properties. Slaughter mass, slaughter output, factors influencing these indicators, rational processing of horse and by-products. Determination of slaughter weight and slaughter output and determination of the structure of the horse carcass. *Dairy productivity.* Basics of the mammary glands structure and milk yield of mares. The mare milk, its biochemical composition, and technological specificity. Organization and technique of manual and mechanical milking of mares. The technology of production of kumis. Organization of rational use of working horses. Determining the farm need for working horses. Determining the milk productivity of mares in various ways.

**Theme 13. Characteristics of the basic technologies of pork production.** Modern technologies of pork production and the main criteria for its determination. Technology as the science about pig production and its general provisions. The technological chain. Technological groups of pigs. Process modeling. Production process. Technological scheme of production. Technological process and operations. Types of pig farms and their specialization.

**Theme 14. The technology of food egg production.** Basic principles of industrial technology of food egg production. The main technological chains of industrial egg production. Forming and keeping the parent flock. Forced molt of the hens and its importance in the production of food eggs. Growing of young poultry for replacement of parent and industrial flock. Keeping and feeding of layer hens of an industrial flock. Feeding egg hens. Grading, storage, and sale of eggs. The calculation of the poultry stock movement of industrial flock and production of food eggs. Calculation of the poultry stock movement of the parent flock. Growing of young poultry for replacement of industrial flock. Drawing up a technological schedule for growing young poultry for the completion of an industrial flock of egg hens. Determination of the live weight of the poultry and the homogeneity of the herd.

**Theme 15. Broiler production technology.** Importance of industrial production of broilers and its basic technological principles. The completion and keeping the parent flock of broilers. Incubation of eggs of meat chickens. Growing young poultry for replacement. Characteristics of technological systems for the production of meat chickens. Feeding of meat chickens. Poultry slaughter and processing. Technological aspects of increasing broiler productivity. Calculation of

the number of broilers at a poultry enterprise. Calculations of the stock of broilers under different conditions of growing.

### **Content module 3. Innovations in animal and poultry feeding.**

**Theme 16. New approaches to feeding cows.** Structure of diets for cows. Feed additives. The effect of feeding on the reproductive capacity of cows. Fight against ketosis. Consumption of dry matter by cows. New cow feeding system at the beginning of lactation. Energy content in the diet. Fodder table in the barn. Improper feeding of cows leading to acidosis, paresis and other diseases. Features of “work” with microelements. Balance of microelements. Causes of cow diseases because of malnutrition (acidosis, paresis, and others). Dietary guidelines for cows, taking into account productivity, physiological condition, and live weight.

**Theme 17. Feeding pigs.** Feed resources. The technology of feed production, feed preparation and feeding of pigs. Harvesting, storage and preparation of feed for feeding. Optimization of equipment selection. The basic requirements for the proper feeding of pigs. Organization of the feed base of pig farming.

**Theme 18. Feeding features and nutrient rationing for farm poultry.** Biological features of digestion of different poultry species. Types of poultry feeding. Calculation of compound feedstuffs recipes and feed requirements for different poultry species and ages. The physiological role of microelements, vitamins in metabolism. Characteristics of the main constituents of feedstuffs and structure of compound feedstuffs and diets for poultry, depending on the type, age, and direction of productivity. Feeding of young poultry and laying hens. Feeding chickens of meat direction.

### **Content module 4. Selection and breeding work in livestock and poultry.**

**Theme 19. Modern livestock programs and livestock records on farms.** Livestock programs of OPCEK, Plemofis, ALTPRO, Uniform AGRI. Evaluation of the body structure of animals. Evaluation of animals by body type. Assessment of the exterior of cattle. Methods of record-keeping and evaluation of dairy productivity of cows.

**Theme 20. Breeding work in horse breeding.** Types of thoroughbred horses testing. Facilities, buildings, structures, paths, and equipment for racetracks for testing riding and trotting horses. The training unit as the main production unit of the racetrack. The purpose and tasks of breeding work in horse breeding and mass horse breeding. Methods of breeding. Matching and selection principles. Use of immunogenetic methods and biotechnology in selection and breeding work. Principles of breeding new breeds of horses. The main forms of record-keeping. Bonitation of horses. Assessment of stallions by the quality of offspring. Compilation and analysis of pedigree stallions (mares).

**Theme 21. Organization of breeding work in pig production on farms of different types.** Zonal pig breeding systems. Types of pig farms and their relationship. Formation of the herd and its structure. Organization of breeding work on farms of different directions. Formation of groups of sows and boars and their evaluation; selection of the young animals for replacement and their



evaluation. Individual and group selection. Bonitation of pigs. The main forms of pedigree record-keeping. Perspective breeding plans for the herd. State pedigree book.

**Theme 22. Objectives and organization of poultry breeding in Ukraine.**

Structure of breeding farms. Labeling and record-keeping of productivity, breeding data processing. Breeding work in first- and second-order reproducers. Flock structure, tagging, and record-keeping of productivity. Bonitation of birds. Features of organization and technique of breeding work with poultry of different species, crosses, and direction of productivity. Studying methods of breeding work with poultry at breeding plants. Studying methods of formation of nests, estimation of nurseries by the quality of offspring. Studying methods of breeding work with poultry in first- and second-order reproductive farms. Studying methods of poultry bonitation. Selection records and breeding plans. Organization of breeding work in poultry.

#### 4. Structure of the subject

Names of content modules	workload											
	full-time education						extramural education					
	total	in particular					total	in particular				
		l	p	lab	ind. a.	ind. w.		l	p	lab	ind. a.	ind. w.
<b>Module 1. Innovative technologies used in the breeding and reproduction of livestock and poultry</b>												
<b>Content module 1. Innovative technologies used in the breeding and reproduction of livestock and poultry.</b>												
<b>Theme 1. Introduction. Innovative technologies as progressive methods in animal husbandry</b>	2	2					5				5	
<b>Theme 2. Intensive technologies of rearing young cattle for herd replacement.</b>	7	2	4			3	6	2	2		2	
<b>Theme 3. Intensive technologies of rearing young horses for herd replacement.</b>	6	2	4				5				5	
<b>Theme 4. Intensive technologies of young pigs growing for replacement.</b>	6	2	2			3	5				5	
<b>Theme 5. Intensive technologies of incubation of farm poultry's eggs.</b>	8	2	4			3	5				5	
<b>Theme 6. Novelties in the reproduction of cattle livestock.</b>	5	2	2			3	7	2			5	
<b>Theme 7. Reproduction of horses.</b>	6	2	2			3	7		2		5	
<b>Theme 8. The technology of pig reproduction.</b>	2	2	-				5				5	
<b>Theme 9. The rearing of young birds. Diagnosis of embryonic death.</b>	2	2					5				5	
<b>Total for content module 1</b>	<b>44</b>	<b>18</b>	<b>18</b>			<b>15</b>	<b>50</b>	<b>4</b>	<b>4</b>		<b>42</b>	
<b>Module 2. Innovations in the production and initial processing of livestock and poultry products.</b>												
<b>Content module 2. Innovations in the production and initial processing of livestock and poultry products.</b>												
<b>Theme 10. Voluntary milking of cows by milking robots under</b>	7	2	4			3	5				5	

conditions of loafing, bud boxes and tethered keeping of cattle.												
Theme 11. The technology of beef production in dairy cattle.	8	2	4			3	11	2	4			5
Theme 12. The productivity of horses.	5	2	2			3	5					5
Theme 13. Characteristics of the basic technologies of pork production.	2	2	-				5					5
Theme 14. The technology of food egg production.	8	2	4			3	5					5
Theme 15. Broiler production technology.	4	2	2				5					5
Total for content module 2	34	12	16			12	36	2	4			30
<b>Module 3. Innovations in animal and poultry feeding.</b>												
<b>Content module 3. Innovations in animal and poultry feeding.</b>												
Theme 16. New approaches to feeding cows.	5	2	2			3	7		2			5
Theme 17. Feeding pigs.	2	2	-				5					5
Theme 18. Feeding features and nutrient rationing for farm poultry.	4	2	2				5					5
Total for content module 3	11	6	4			3	17		2			15
<b>Module 4. Selection and breeding work in livestock and poultry</b>												
<b>Content module 4. Selection and breeding work in livestock and poultry</b>												
Theme 19. Modern livestock programs and livestock records on farms.	4	2	-				2	2				
Theme 20. Breeding work in horse breeding.	6	2	2				5					5
Theme 21. Organization of breeding work in pig production on farms of different types.	6	2	2				5					5
Theme 22. Objectives and organization of poultry breeding in Ukraine.	5	2	2			2	5					5
Total for content	21	8	6			2	17	2				15

<b>module 4</b>												
<i>Total workload</i>	120	44	44	-	-	32		8	10	-	-	102

### 5. Themes and plan of lectures (full-time education)

No.	Theme	Workload
1	<p><b>Theme 1. Introduction. Innovative technologies as progressive methods in animal husbandry.</b></p> <p>1. Livestock as a branch of the national economy and agricultural production.</p> <p>2. The importance of animal husbandry in the national economy of Ukraine.</p> <p>3. The main forms of enterprises and farms engaged in the production of products of livestock, pig, poultry, and horse breeding.</p>	2
2	<p><b>Theme 2. Intensive technologies of rearing young cattle for herd replacement.</b></p> <p>1. Creation of a pedigree core on the farm.</p> <p>2. Application of progressive milk feeding schemes to calves during the milking period (foreign experience).</p> <p>3. Organization of record-keeping and control over rearing young animals.</p> <p>4. The effect of different levels of intensity of calves rearing during the first three months on subsequent dairy productivity during the first finished lactation period.</p>	2
3	<p><b>Theme 3. Intensive technologies of rearing young horses for herd replacement.</b></p> <p>1. Regularities of growth and development of young animals.</p> <p>2. Foals growing till weaning, supplementary feeding of lactating mares and foals.</p> <p>3. Foals weaning and growing to one year old.</p> <p>4. Features of growing young draft horses.</p>	2
4	<p><b>Theme 4. Intensive technologies of young pigs growing for replacement.</b></p> <p>1. Factors determining the high stability of young animals growing for replacement.</p> <p>2. Selection, removing of the worst, evaluation of pedigree young animals and animals for replacement.</p> <p>3. Technological features of their growing.</p> <p>4. Intensification of growing pigs for replacement.</p> <p>5. The value of exercise and pasture maintenance.</p> <p>6. Biological features of suckling piglets determining the technology of their growing: lack of immunity, the</p>	2

	imperfection of the thermal regulation mechanism, high intensity of growth and metabolism.	
5	<p><b>Theme 5. Intensive technologies of incubation of farm poultry eggs.</b></p> <ol style="list-style-type: none"> <li>1. The history of incubation. Factors affecting the incubation quality of eggs.</li> <li>2. Incubation technology.</li> <li>3. Egg incubation regimen.</li> <li>4. Evaluation of daily young poultry.</li> <li>5. Biological control of incubation.</li> <li>6. The concept of incubation regimens. Types of incubation regimens.</li> <li>7. Application of incubation regimens for different types of poultry, layout scheme.</li> </ol>	2
6	<p><b>Theme 6. Novelties in reproduction of cattle livestock.</b></p> <ol style="list-style-type: none"> <li>1. Timely fertilization of cows as the way to the efficient operation of the dairy farm.</li> <li>2. Synchronization of <i>libido sexualis</i>, ovulation and insemination.</li> <li>3. Schemes of intensification of cow reproduction.</li> <li>4. Evaluation of animals to be synchronized.</li> <li>5. Organization of synchronization of <i>libido sexualis</i>.</li> <li>6. Timely introduction of the required substances according to the timetable.</li> </ol>	2
7	<p><b>Theme 7. Reproduction of horses.</b></p> <ol style="list-style-type: none"> <li>1. Methods of horse reproduction.</li> <li>2. Reproduction objectives, puberty, mating age, duration of breeding use of stallions and mares.</li> <li>3. Regularities of sexual cycles, the mating season.</li> <li>4. Time-frame and methods of mating mares.</li> <li>5. Diagnosis of mare pregnancy.</li> </ol>	2
8	<p><b>Theme 8. The technology of pig reproduction.</b></p> <ol style="list-style-type: none"> <li>1. Preparation of sows for farrowing and its conducting.</li> <li>2. Maintenance and feeding of lactating sows.</li> <li>3. Stimulation and synchronization of sows' <i>libido sexualis</i> and farrowing.</li> <li>4. Machine types and design features.</li> <li>5. Long-term use of sows.</li> </ol>	2
9	<p><b>Theme 9. The rearing of young birds. Diagnosis of embryonic death.</b></p> <ol style="list-style-type: none"> <li>1. The technology of selection of the youngsters and their post-incubation treatment.</li> <li>2. Preparation for transportation of the youngsters.</li> <li>4. Assessing the quality of day-old youngsters and determining their sex.</li> </ol>	2

	<p>5. Signs characterizing the embryo in violation of incubation regimens.</p> <p>6. Assessing the quality of day-old youngsters and determining their sex.</p>	
10	<p><b>Theme 10. Voluntary milking of cows by milking robots under conditions of loafing, bud boxes and tethered keeping of cattle.</b></p> <p>1. Principles of formation of technological groups of cows under different milk production systems.</p> <p>2. Milking-parlours “Yalynka” (Fir-tree), “Yalynka 30” (Fir-tree 30), “Yalynka 50” (Fir-tree 50) and milking parlour of rotor type.</p> <p>4. Milking parlours “Paralel” (Parallels). Milking systems “Midiline<sup>TM</sup>”.</p> <p>5. Systems and methods for keeping dairy cows.</p> <p>6. Warm and cold keeping of cows.</p> <p>7. Control milking of cows.</p>	2
11	<p><b>Theme 11. Technology of beef production in dairy cattle.</b></p> <p>1. The concept of cattle growing and feeding up.</p> <p>2. Types of farms for growing and feeding up cattle, and the procedure of completion them with young animals.</p> <p>3. Requirements for young animals intended for growing and feeding up in ordinary and specialized farms.</p> <p>4. Characteristics of young animals feeding reared for meat in milk and post-milk periods.</p> <p>5. Keeping of young animals under different systems of growing and feeding up.</p> <p>6. Organization of forage base in high-tech, ordinary farms and agricultural enterprises.</p>	2
12	<p><b>Theme 12. The productivity of horses.</b></p> <p>1. <i>Working productivity.</i> Indicators determining the productivity of horses: breed and thoroughbred, type, weight, age, level of training, adaptability, health, conditions of feeding, care, and maintenance.</p> <p>2. Working qualities of horses.</p> <p>3. <i>Meat productivity.</i> Horse meat as a foodstuff, its chemical composition, nutrition, and dietary properties.</p> <p>4. <i>Dairy productivity.</i> Basics of the mammary glands structure and milk yield of mares.</p> <p>5. The mare milk, its biochemical composition, and technological specificity. Organization and technique of manual and mechanical milking of mares.</p>	2
13	<p><b>Theme 13. Characteristics of the basic technologies of pork production.</b></p> <p>1. Modern technologies of pork production and the main</p>	2

	<p>criteria for its determination.</p> <p>2. Technology as the science about pig production and its general provisions.</p> <p>3. The technological chain.</p> <p>4. Technological groups of pigs.</p> <p>5. Production process. Technological scheme of production. Technological process and operations.</p> <p>6. Types of pig farms and their specialization.</p>	
14	<p><b>Theme 14. The technology of food egg production.</b></p> <p>1. Basic principles of industrial technology of food egg production.</p> <p>2. The main technological chains of industrial egg production.</p> <p>3. Forming and keeping the parent flock.</p> <p>4. Forced molt of the hens and its importance in the production of food eggs.</p> <p>5. Growing of young poultry for replacement of parent and industrial flock.</p>	2
15	<p><b>Theme 15. Broiler production technology.</b></p> <p>1. Importance of industrial production of broilers and its basic technological principles.</p> <p>2. The completion and keeping the parent flock of broilers.</p> <p>3. Incubation of eggs of meat chickens.</p> <p>4. Growing young poultry for replacement.</p> <p>5. Characteristics of technological systems for the production of meat chickens.</p>	2
16	<p><b>Theme 16. New approaches to feeding cows.</b></p> <p>1. Structure of diets for cows.</p> <p>2. Feed additives.</p> <p>3. The effect of feeding on the reproductive capacity of cows.</p> <p>4. Fight against ketosis.</p> <p>5. Consumption of dry matter by cows.</p> <p>6. New cow feeding system at the beginning of lactation.</p> <p>7. Energy content in the diet.</p> <p>8. Fodder table in the barn.</p>	2
17	<p><b>Theme 17. Feeding pigs.</b></p> <p>1. Feed resources.</p> <p>2. The technology of feed production, feed preparation and feeding of pigs.</p> <p>3. Harvesting, storage and preparation of feed for feeding.</p> <p>4. Optimization of equipment selection.</p> <p>5. The basic requirements for the proper feeding of pigs.</p> <p>6. Organization of the feed base of pig farming.</p>	2
18	<p><b>Theme 18. Feeding features and nutrient rationing for</b></p>	2

	<p><b>farm poultry.</b></p> <ol style="list-style-type: none"> <li>1. Biological features of digestion of different poultry species.</li> <li>2. Types of poultry feeding.</li> <li>3. Calculation of compound feedstuffs recipes and feed requirements for different poultry species and ages.</li> <li>4. The physiological role of microelements, vitamins in metabolism.</li> <li>5. Characteristics of the main constituents of feedstuffs and structure of compound feedstuffs and diets for poultry, depending on the type, age, and direction of productivity.</li> </ol>	
19	<p><b>Theme 19. Modern livestock programs and livestock records on farms.</b></p> <ol style="list-style-type: none"> <li>1. Livestock programs of OPCEK, Plemofis, ALTPRO, Uniform AGRI.</li> <li>2. Evaluation of the body structure of animals.</li> <li>3. Evaluation of animals by body type.</li> <li>4. Assessment of the exterior of cattle.</li> <li>5. Methods of record-keeping and evaluation of dairy productivity of cows.</li> </ol>	2
20	<p><b>Theme 20. Breeding work in horse breeding.</b></p> <ol style="list-style-type: none"> <li>1. Types of thoroughbred horses testing.</li> <li>2. Facilities, buildings, structures, paths, and equipment for racetracks for testing riding and trotting horses.</li> <li>3. The training unit as the main production unit of the racetrack.</li> <li>4. The purpose and tasks of breeding work in horse breeding and mass horse breeding.</li> <li>5. Methods of breeding.</li> <li>6. Selection and matching principles.</li> </ol>	2
21	<p><b>Theme 21. Organization of breeding work in pig production on farms of different types.</b></p> <ol style="list-style-type: none"> <li>1. Zonal pig breeding systems.</li> <li>2. Types of pig farms and their relationship.</li> <li>3. Formation of the herd and its structure.</li> <li>4. Organization of breeding work on farms of different directions.</li> <li>5. Formation of groups of sows and boars and their evaluation; selection of the young animals for replacement and their evaluation.</li> </ol>	2
22	<p><b>Theme 22. Objectives and organization of poultry breeding in Ukraine.</b></p> <ol style="list-style-type: none"> <li>1. Structure of pedigree farms.</li> <li>2. Labeling and record-keeping of productivity, breeding data processing.</li> </ol>	2



	<p>3. Breeding work in first- and second-order reproducers.</p> <p>4. Flock structure, tagging, and record-keeping of productivity.</p> <p>5. Bonitation of birds.</p> <p>6. Features of organization and technique of breeding work with poultry of different species, crosses, and direction of productivity.</p>	
	<b>Total</b>	<b>44</b>

### 6. Themes and plan of lectures (extramural education)

No.	Theme	Workload
1	<p><b>Theme 1. Intensive technologies of rearing young cattle for herd replacement.</b></p> <p>1. Creation of a pedigree core on the farm.</p> <p>2. Application of progressive milk feeding schemes to calves during the milking period (foreign experience).</p> <p>3. Organization of record-keeping and control over rearing young animals.</p> <p>4. The effect of different levels of intensity of calves rearing during the first three months on subsequent dairy productivity during the first finished lactation period.</p>	2
2	<p><b>Theme 2. Novelties in the reproduction of cattle livestock.</b></p> <p>1. Timely fertilization of cows as the way to the efficient operation of the dairy farm.</p> <p>2. Synchronization of <i>libido sexualis</i>, ovulation and insemination.</p> <p>3. Schemes of intensification of cow reproduction.</p> <p>4. Evaluation of animals to be synchronized.</p> <p>5. Organization of synchronization of <i>libido sexualis</i>.</p> <p>6. Timely introduction of the required substances according to the timetable.</p>	2
3	<p><b>Theme 3. The technology of beef production in dairy cattle.</b></p> <p>1. The concept of cattle growing and feeding up.</p> <p>2. Types of farms for growing and feeding up cattle, and the procedure of completion of them with young animals.</p> <p>3. Requirements for young animals intended for growing and feeding up in ordinary and specialized farms.</p> <p>4. Characteristics of young animals feeding reared for meat in milk and post-milk periods.</p> <p>5. Keeping young animals under different systems of growing and feeding up.</p> <p>6. Organization of forage base in high-tech, ordinary</p>	2

	farms and agricultural enterprises.	
4	<b>Theme 4. Modern livestock programs and livestock records on farms.</b> 1. Livestock programs of OPCEK, Plemofis, ALTPRO, Uniform AGRI. 2. Evaluation of the body structure of animals. 3. Evaluation of animals by body type. 4. Assessment of the exterior of cattle. 5. Methods of record-keeping and evaluation of dairy productivity of cows.	2
	<b>Total</b>	<b>8</b>

### 7. Themes of laboratory classes (full-time education)

No.	Theme	Workload
1	<b>Theme 2. Intensive technologies of rearing young cattle for herd replacement.</b> Methods of calves' disinfection. Tail docking. Weighing. Gradual training of dairy calves to eat coarse and concentrated forage. Cold method of growing calves. Individual cages for growing calves during the milk period. Maintenance of production and breeding records in animal husbandry.	4
2	<b>Theme 3. Intensive technologies of rearing young horses for herd replacement.</b> Control over the development of the young. Calculations of operational control of young animals' development. Feeding standards for pedigree and working horses and dieting in summer and winter. Pasture keeping of horses. Features of growing young draft horses.	4
3	<b>Theme 4. Intensive technologies of young pigs growing for replacement.</b> Care and maintenance of suckling piglets. Prevention of anemia and gastrointestinal diseases. Piglets' needs for nutrients and the rationale for feeding schemes.	2
4	<b>Theme 5. Intensive technologies of incubation of farm poultry eggs.</b> Incubator premises, types of incubators, automation of particular incubator systems. Studying technical characteristics of industrial incubators. Studying differentiated and stable incubation regimes. Scheme and schedule of laying eggs in the incubator. Methods for assessing the quality of incubation eggs. The technological process of incubation. Features of technological process in egg incubation of different types of poultry. Natural and artificial incubation of poultry eggs.	4
5	<b>Theme 6. Novelties in the reproduction of cattle</b>	2

	<b>livestock.</b> Insemination of cows for 2 hours before or after milking. Keeping animals after insemination. Diagnosis of pregnancy of cows and heifers.	
6	<b>Theme 7. Reproduction of horses.</b> Care of pregnant mares. Foaling, rules of foals' naming. Methods for determining mares' <i>libido sexualis</i> by teaser stallion. Methods of preparation of mares for pairing and technique of its conducting. Drawing up a plan for pairing and foaling of mares.	2
7	<b>Theme 10. Voluntary milking of cows by milking robots under conditions of loafing, bud boxes and tethered keeping of cattle.</b> Dairy robots. Milk tanks. Requirements for the design and construction of dairy rooms. Artificial sources of cold. Refrigeration units used in dairy farms. Centrifugal milk purifiers that are widely used in the dairy industry. Water heaters for the heat processing of milk. Pasteurizer OPD-1M (ОПД-1М).	4
8	<b>Theme 11. The technology of beef production in dairy cattle.</b> Growing and feeding up livestock using food processing industry wastes. Organization of feeding up of adult cattle. Fattening cattle. Modeling of flow organization of the technological process of growing and feeding up young cattle. Determination of the cycle, rhythm, and front of the works. Cycle chart of livestock movement by production periods. Technological operations for different methods of keeping and fattening livestock, determining their most appropriate technological sequence and environmental assessment. Operating and technological process maps.	4
9	<b>Theme 12. The productivity of horses.</b> Feeding, watering and keeping working horses. Types of harness, its classification. Slaughter mass, slaughter output, factors influencing these indicators, rational processing of horse and by-products. Determination of slaughter weight and slaughter output and determination of the structure of the horse carcass. The technology of production of kumis. Organization of rational use of working horses.	2
10	<b>Theme 14. The technology of food egg production.</b> Keeping and feeding of layer hens of an industrial flock. Feeding egg hens. Grading, storage, and sale of eggs. The calculation of the poultry stock movement of industrial flock and production of food eggs. Calculation of the poultry stock movement of the parent flock. Growing of young poultry for replacement of industrial flock.	4
11	<b>Theme 15. Broiler production technology.</b> Feeding of	2

	meat chickens. Poultry slaughter and processing. Technological aspects of increasing broiler productivity. Calculation of the number of broilers at a poultry enterprise. Calculations of the stock of broilers under different conditions of growing.	
12	<b>Theme 16. New approaches to feeding cows.</b> Causes of cow diseases because of malnutrition (acidosis, paresis, and others). Dietary guidelines for cows, taking into account productivity, physiological condition, and live weight.	2
13	<b>Theme 18. Feeding features and nutrient rationing for farm poultry.</b> Feeding of young poultry and laying hens. Feeding chickens of meat direction.	2
14	<b>Theme 20. Breeding work in horse breeding.</b> Use of immunogenetic methods and biotechnology in selection and breeding work. Principles of breeding new breeds of horses. The main forms of record-keeping. Bonitation of horses. Evaluation of stallions by the quality of offspring. Compilation and analysis of pedigree stallions (mares).	2
15	<b>Theme 21. Organization of breeding work in pig production on farms of different types.</b> Individual and group selection. Bonitation of pigs. The main forms of pedigree record-keeping. Perspective breeding plans for the herd. State pedigree book.	2
16	<b>Theme 22. Objectives and organization of poultry breeding in Ukraine.</b> Studying methods of breeding work with poultry at breeding plants. Studying methods of formation of nests, estimation of nurseries by the quality of offspring. Studying methods of bonitation of birds.	2
	<b>Total</b>	<b>44</b>

### 8. Themes of laboratory classes (extramural education)

No.	Theme	Workload
1	<b>Theme 2. Intensive technologies of rearing young cattle for herd replacement.</b> Methods of calves' disinfection. Tail docking. Weighing. Gradual training of dairy calves to eat coarse and concentrated forage. Cold method of growing calves. Individual cages for growing calves during the milk period. Maintenance of production and breeding records in animal husbandry.	2
2	<b>Theme 10. Voluntary milking of cows by milking robots under conditions of loafing, bud boxes and tethered keeping of cattle.</b> Dairy robots. Milk tanks. Requirements for the design and construction of dairy rooms. Artificial	2

	sources of cold. Refrigeration units used in dairy farms. Centrifugal milk purifiers that are widely used in the dairy industry. Water heaters for the heat processing of milk. Pasteurizer OPD-1M (ОПД-1М).	
3	<b>Theme 11. The technology of beef production in dairy cattle.</b> Growing and feeding up livestock using food processing industry wastes. Organization of feeding up of adult cattle. Fattening cattle. Modeling of flow organization of the technological process of growing and feeding up young cattle. Determination of the cycle, rhythm, and front of the works. Cycle chart of livestock movement by production periods. Technological operations for different methods of keeping and fattening livestock, determining their most appropriate technological sequence and environmental assessment. Operating and technological process maps.	4
4	<b>Theme 16. New approaches to feeding cows.</b> Causes of cow diseases because of malnutrition (acidosis, paresis, and others). Dietary guidelines for cows, taking into account productivity, physiological condition, and live weight.	2
	<b>Total</b>	<b>10</b>

### 9. Individual work (full-time education)

No.	Theme	Workload
1	<b>Theme 2. Intensive technologies of rearing young cattle for herd replacement.</b> Maintenance of production and breeding records in animal husbandry.	3
2	<b>Theme 4. Intensive technologies of young pigs growing for replacement.</b> The value of early piglets' supplementary feeding, supplementary feeding schemes. Optimal technological parameters for growing piglets, prevention of losses. Weaning of piglets. The terms of weaning and their substantiation, advantages, and disadvantages. The technique for weaning piglets.	3
3	<b>Theme 5. Intensive technologies of incubation of farm poultry eggs.</b> Collecting, packing, transporting, grading and storing eggs. Pre-incubation processing of eggs. Requirements for the quality of incubation eggs of different species of poultry. Biological control of incubation. Calculations of production of incubation eggs and by-products from second-order reproducers.	3
4	<b>Theme 6. Novelties in the reproduction of cattle</b>	3

	<b>livestock.</b> The technology of one-off cessation of milk production, or dry-off of cows. Evaluation of the reproductive capacity of cattle.	
5	<b>Theme 7. Reproduction of horses.</b> Analysis of the results of farms' mares mating and foaling during the past year. Determining the efficiency of breeding stallions and mares. Guidelines for the care of pregnant mares.	3
6	<b>Theme 10. Voluntary milking of cows by milking robots under conditions of loafing, bud boxes and tethered keeping of cattle.</b> Universal plate pasteurizers. Determination of milk quality at dairy complexes and farms.	3
7	<b>Theme 11. The technology of beef production in dairy cattle.</b> Experience of the best farms of Ukraine and the world on growing and feeding up cattle. An economic evaluation of existing technological solutions for livestock breeding and fattening.	3
8	<b>Theme 12. The productivity of horses.</b> Determination of slaughter weight and slaughter output and determination of the structure of the horse carcass. Determining the farm need for working horses. Determining the milk productivity of mares in various ways.	3
9	<b>Theme 14. The technology of food egg production.</b> Drawing up a technological schedule for growing young poultry for the completion of an industrial flock of egg hens. Determination of the live weight of the poultry and the homogeneity of the herd.	3
10	<b>Theme 16. New approaches to feeding cows.</b> Improper feeding of cows leading to acidosis, paresis and other diseases. Features of "work" with microelements. Balance of microelements.	3
11	<b>Theme 22. Objectives and organization of poultry breeding in Ukraine.</b> Selection records and breeding plans. Organization of breeding work in poultry.	2
	<b>Total</b>	<b>32</b>

**10. Individual work  
(extramural education)**

№ з/п	Theme	Workload
1	<b>Theme 1. Introduction. Innovative technologies as progressive methods in animal husbandry.</b> Livestock as a	5

	branch of the national economy and agricultural production. The importance of animal husbandry in the national economy of Ukraine. The main forms of enterprises and farms engaged in the production of products of livestock, pig, poultry, and horse breeding.	
2	<b>Theme 2. Intensive technologies of rearing young cattle for herd replacement.</b> Maintenance of production and breeding records in animal husbandry.	2
3	<b>Theme 3. Intensive technologies of rearing young horses for herd replacement.</b> Control over the development of young animals. Calculations of operational control of young animals' development. Feeding standards for pedigree and working horses and dieting in summer and winter. Pasture keeping of horses. Regularities of growth and development of young animals. Foals growing till weaning, supplementary feeding of lactating mares and foals. Foals weaning and growing to one year old. Features of growing young draft horses.	5
4	<b>Theme 4. Intensive technologies of young pigs growing for replacement.</b> Care and maintenance of suckling piglets. Prevention of anemia and gastrointestinal diseases. Piglets' needs for nutrients and the rationale for feeding schemes. Factors determining the high stability of young animals growing for replacement. Selection, removing of the worst, evaluation of pedigree young animals and animals for replacement. Technological features of their growing. Intensification of growing pigs for replacement. The value of exercise and pasture maintenance. Norms and rations of feeding. Biological features of suckling piglets determining the technology of their growing: lack of immunity, the imperfection of the thermal regulation mechanism, high intensity of growth and metabolism. The value of early piglets' supplementary feeding, supplementary feeding schemes. Optimal technological parameters for growing piglets, prevention of losses. Weaning of piglets. The terms of weaning and their substantiation, advantages, and disadvantages. The technique for weaning piglets.	5
5	<b>Theme 5. Intensive technologies of incubation of farm poultry eggs.</b> Incubator premises, types of incubators, automation of particular incubator systems. Studying technical characteristics of industrial incubators. Studying differentiated and stable incubation regimes. Scheme and schedule of laying eggs in the incubator. Methods for assessing the quality of incubation eggs. The technological process of incubation. Features of technological process in	5

	egg incubation of different types of poultry. Natural and artificial incubation of poultry eggs. The history of incubation. Factors affecting the incubation quality of eggs. Incubation technology. Egg incubation regimen. Evaluation of daily young poultry. Biological control of incubation. The concept of incubation regimens. Types of incubation regimens. Application of incubation regimens for different types of poultry, layout scheme. Collecting, packing, transporting, grading and storing eggs. Pre-incubation processing of eggs. Requirements for the quality of incubation eggs of different species of poultry. Biological control of incubation. Calculations of production of incubation eggs and by-products from second-order reproducers.	
6	<b>Theme 6. Novelties in the reproduction of cattle livestock.</b> The technology of one-off cessation of milk production, or dry-off of cows. Evaluation of the reproductive capacity of cattle. Insemination of cows for 2 hours before or after milking. Keeping animals after insemination. Diagnosis of pregnancy of cows and heifers.	5
7	<b>Theme 7. Reproduction of horses.</b> Care of pregnant mares. Foaling, rules of foals' naming. Methods for determining mares' <i>libido sexualis</i> by teaser stallion. Methods of preparation of mares for pairing and technique of its conducting. Drawing up a plan for pairing and foaling of mares. Analysis of the results of farms' mares mating and foaling during the past year. Determining the efficiency of breeding stallions and mares. Guidelines for the care of pregnant mares. Methods of horse reproduction. Reproduction objectives, puberty, mating age, duration of breeding use of stallions and mares. Regularities of sexual cycles, the mating season. Time-frame and methods of mating mares. Diagnosis of mare pregnancy.	5
8	<b>Theme 8. The technology of pig reproduction.</b> Preparation of sows for farrowing and its conducting. Maintenance and feeding of lactating sows. Stimulation and synchronization of sows' <i>libido sexualis</i> and farrowing. Machine types and design features. Long-term use of sows.	5
9	<b>Theme 9. The rearing of young birds. Diagnosis of embryonic death.</b> The technology of selection of the youngsters and their post-incubation treatment. Preparation for transportation of the youngsters. Assessing the quality of day-old youngsters and determining their sex. Processing, packing, and transportation of the day-old youngsters. Signs characterizing the embryo in violation of	5



	incubation regimens. Assessing the quality of day-old youngsters and determining their sex.	
10	<b>Theme 10. Voluntary milking of cows by milking robots under conditions of loafing, bud boxes and tethered keeping of cattle.</b> Principles of formation of technological groups of cows under different milk production systems. Milking-parlours "Yalynka" (Fir-tree), "Yalynka 30" (Fir-tree 30), "Yalynka 50" (Fir-tree 50) and milking parlor of rotor type. Milking parlors "Paralel" (Parallels). Milking systems "Midiline <sup>TM</sup> ". Systems and methods for keeping dairy cows. Warm and cold keeping of cows. The tethering of cows. Control milking of cows. Universal plate pasteurizers. Determination of milk quality at dairy complexes and farms.	5
11	<b>Theme 11. The technology of beef production in dairy cattle.</b> The concept of cattle growing and feeding up. Types of farms for growing and feeding up cattle, and the procedure of completion of them with young animals. Requirements for young animals intended for growing and feeding up in ordinary and specialized farms. Characteristics of young animals feeding reared for meat in milk and post-milk periods. Keeping young animals under different systems of growing and feeding up. Organization of forage base in high-tech, ordinary farms and agricultural enterprises. Organization of forage base in high-tech, ordinary farms, and agricultural enterprises. Experience of the best farms of Ukraine and the world on growing and feeding up cattle. An economic evaluation of existing technological solutions for livestock breeding and fattening.	5
12	<b>Theme 12. The productivity of horses</b> Feeding, watering and keeping working horses. Types of harness, its classification. Slaughter mass, slaughter output, factors influencing these indicators, rational processing of horse and by-products. Determination of slaughter weight and slaughter output and determination of the structure of the horse carcass. The technology of production of kumis. Organization of rational use of working horses. Determining the farm need for working horses. Determining the milk productivity of mares in various ways. <i>Working productivity</i> . Indicators determining the productivity of horses: breed and thoroughbred, type, weight, age, level of training, adaptability, health, conditions of feeding, care, and maintenance. Working qualities of horses. <i>Meat productivity</i> . Horse meat as a	5

	foodstuff, its chemical composition, nutrition, and dietary properties. <i>Dairy productivity</i> . Basics of the mammary glands structure and milk yield of mares. The mare milk, its biochemical composition, and technological specificity. Organization and technique of manual and mechanical milking of mares.	
13	<b>Theme 13. Characteristics of the basic technologies of pork production.</b> Modern technologies of pork production and the main criteria for its determination. Technology as the science about pig production and its general provisions. The technological chain. Technological groups of pigs. Process modeling. Production process. Technological scheme of production. Technological process and operations. Types of pig farms and their specialization.	5
14	<b>Theme 14. The technology of food egg production.</b> Keeping and feeding of layer hens of an industrial flock. Feeding egg hens. Grading, storage, and sale of eggs. The calculation of the poultry stock movement of industrial flock and production of food eggs. Calculation of the poultry stock movement of the parent flock. Growing of young poultry for replacement of industrial flock. Basic principles of industrial technology of food egg production. The main technological chains of industrial egg production. Forming and keeping the parent flock. Forced molt of the hens and its importance in the production of food eggs. Growing of young poultry for replacement of parent and industrial flock. Drawing up a technological schedule for growing young poultry for the completion of an industrial flock of egg hens. Determination of the live weight of the poultry and the homogeneity of the herd.	5
15	<b>Theme 15. Broiler production technology.</b> Feeding of meat chickens. Poultry slaughter and processing. Technological aspects of increasing broiler productivity. Calculation of the number of broilers at a poultry enterprise. Calculations of the stock of broilers under different conditions of growing. Importance of industrial production of broilers and its basic technological principles. The completion and keeping the parent flock of broilers. Incubation of eggs of meat chickens. Growing young poultry for replacement. Characteristics of technological systems for the production of meat chickens.	5
16	<b>Theme 16. New approaches to feeding cows.</b> Improper feeding of cows leading to acidosis, paresis and other diseases. Features of “work” with microelements. Balance of microelements. Structure of diets for cows. Feed	5

	additives. The effect of feeding on the reproductive capacity of cows. Fight against ketosis. Consumption of dry matter by cows. New cow feeding system at the beginning of lactation. Energy content in the diet. Fodder table in the barn.	
17	<b>Theme 17. Feeding pigs.</b> Feed resources. The technology of feed production, feed preparation and feeding of pigs. Harvesting, storage and preparation of feed for feeding. Optimization of equipment selection. The basic requirements for the proper feeding of pigs. Organization of the feed base of pig farming.	5
18	<b>Theme 18. Feeding features and nutrient rationing for farm poultry.</b> Feeding of young poultry and laying hens. Feeding chickens of meat direction. Biological features of digestion of different poultry species. Types of poultry feeding. Calculation of compound feedstuffs recipes and feed requirements for different poultry species and ages. The physiological role of microelements, vitamins in metabolism. Characteristics of the main constituents of feedstuffs and structure of compound feedstuffs and diets for poultry, depending on the type, age, and direction of productivity.	5
19	<b>Theme 20. Breeding work in horse breeding.</b> Use of immunogenetic methods and biotechnology in selection and breeding work. Principles of breeding new breeds of horses. The main forms of record-keeping. Bonitation of horses. Assessment of stallions by the quality of offspring. Compilation and analysis of pedigree stallions (mares). Types of thoroughbred horses testing. Facilities, buildings, structures, paths, and equipment for racetracks for testing riding and trotting horses. The training unit as the main production unit of the racetrack. The purpose and tasks of breeding work in horse breeding and mass horse breeding. Methods of breeding. Matching and selection principles.	5
20	<b>Theme 21. Organization of breeding work in pig production on farms of different types.</b> Individual and group selection. Bonitation of pigs. The main forms of pedigree record-keeping. Perspective breeding plans for the herd. State pedigree book. Zonal pig breeding systems. Types of pig farms and their relationship. Formation of the herd and its structure. Organization of breeding work on farms of different directions. Formation of groups of sows and boars and their evaluation; selection of the young animals for replacement and their evaluation.	5
21	<b>Theme 22. Objectives and organization of poultry</b>	5

	<p><b>breeding in Ukraine.</b> Studying methods of breeding work with poultry at breeding plants. Studying methods of formation of nests, estimation of nurseries by the quality of offspring. Studying methods of breeding work with poultry in first- and second-order reproductive farms. Studying methods of poultry bonitation. Structure of breeding farms. Labeling and record-keeping of productivity, breeding data processing. Breeding work in first- and second-order reproducers. Flock structure, tagging, and record-keeping of productivity. Bonitation of birds. Features of organization and technique of breeding work with poultry of different species, crosses, and direction of productivity. Selection records and breeding plans. Organization of breeding work in poultry.</p>	
	<b>Total</b>	<b>102</b>

## 11. Learning methods

1. **By the source of knowledge:**
  - 1.1. *Verbal:* story, explanation, lecture, instruction.
  - 1.2. *Visual:* demonstration, illustration.
  - 1.3. *Practical:* laboratory method, practical work
2. **Methods of learning by the nature of the logic of knowledge.**
  - 2.1. *Analytical.*
3. **Methods of training by the nature and level of independent mental activity of postgraduates.**
  - 3.1. Problem (problem-informational)
  - 3.2. Research
  - 3.4. Explanatory-demonstrative
  - 3.5. Personalized learning
  - 3.6. Differentiated instruction
  - 3.7. Learning through request
4. **Active learning methods** – using technical means of teaching, occupational training, using training and controlling tests, the use of supporting lecture notes.
5. **Interactive learning technologies** – using multimedia technologies,

## 12. Methods of control

1. ECTS 100 – point scale rating
2. Intermediate control during the semester (intermediate attestation)
3. Multicriteria assessment of current work of postgraduates:
  - the level of knowledge demonstrated in practical, laboratory classes;
  - activity during the discussion of the issues raised in the classes;
  - results of performance and defense of practical works;
  - self-study of the theme as a whole one or particular issues;

– test results.

4. Assessment during project defense and credit pass is conducted by a collegial group of academic staff by the creation of a commission.

### 13. Distribution of points got by postgraduates

Current control and individual work					Modules and individual work	Total
CM1-18 points	CM2-17 points	CM3-18 points	CM4-17 points	Individual work		
T1 – T9	T10 – T15	T16 – T18	T19 – T22	30	100 (70+30)	100

### Rating scale: national and ECTS

Rating in points (for all types of educational activity)	Rating scale ECTS	Rating national scale	
		exam, term paper (project, thesis), industrial practice.	credit
90 – 100	<b>A</b>	good  satisfactory	Pass
82-89	<b>B</b>		
74-81	<b>C</b>		
64-73	<b>D</b>		
60-63	<b>E</b>		
35-59	<b>FX</b>	unsatisfactory (with the possibility of reassembly)	Failed with a possibility to retake the credit test
1-34	<b>F</b>	Unsatisfactorily (with the obligatory repeated course)	Filed with obligatory repeated course)

### 14. Methodical support

1. Костенко В.І. Практикум із скотарства і технології виробництва молока та яловичини. – К.: Урожай, 2006. – 256 с. [Kostenko V.I. Praktykum iz Skotarstva i Tekhnolohii Vyrobnytstva Moloka ta Yalovychyny. – K. Urozhai 2006. – 256 P.]
2. Технологія виробництва продукції птахівництва. Походження і продуктивність птиці. Методичні вказівки щодо проведення практичних занять. - Суми, 2015. - с., бібл. 40. [Tekhnolohiia vyrobnytstva produktsii ptakhivnytstva. Pokhodzhennia i produktyvnist pytsi. Metodychni vkazivky shchodo provedennia praktychnykh zaniat. - Sumy, 2015.- p., bibl. 40.]

3. Технологія виробництва продукції птахівництва. Будова вісцеральної системи організму птахів. Методичні вказівки щодо проведення практичних занять. - Суми, 2015. - с., бібл. 40. [Tekhnolohiia vyrobnytstva produktsii ptakhivnytstva. Budova vistseralnoi systemy orhanizmu ptakhiv. Metodychni vkazivky shchodo provedennia praktychnykh zaniat. - Sumy, 2015.- р., bibl. 40.]
4. Технологія виробництва продукції птахівництва. Будова інтегруючої системи організму птахів. Методичні вказівки щодо проведення практичних занять. - Суми, 2015.- с., бібл. 40. [Tekhnolohiia vyrobnytstva produktsii ptakhivnytstva. Budova intehruiuchoi systemy orhanizmu ptakhiv. Metodychni vkazivky shchodo provedennia praktychnykh zaniat. - Sumy, 2015.- р., bibl. 40.]
5. Технологія виробництва продукції птахівництва. Будова соматичної системи організму птахів. Методичні вказівки щодо проведення практичних занять. - Суми, 2015. - с., бібл. 40. [Tekhnolohiia vyrobnytstva produktsii ptakhivnytstva. Budova somatychnoi systemy orhanizmu ptakhiv. Metodychni vkazivky shchodo provedennia praktychnykh zaniat. - Sumy, 2015.- р., bibl. 40.]

## **15. Recommended literature**

### *Basic literature*

1. Ю.Д. Рубан, С.Ю. Рубан. Технологія виробництва молока і яловичини – Харків, Еспада, 2011 рік, 793 с. [Yu.D. Ruban, S.Iu. Ruban. Tekhnolohiia vyrobnytstva moloka i yalovychyny – Kharkiv, Espada, 2011 rik, 793 p.]
2. Ю.Д. Рубан. Технологія виробництва молока і яловичини – Харків, Еспада, 2015 рік, 572 с. [Yu.D. Ruban. Tekhnolohiia vyrobnytstva moloka i yalovychyny – Kharkiv, Espada, 2015 rik, 572 p.]
3. Фермер: базовий рівень – Суми, Університетська книга, 2013 рік. – 458 с. [Fermer: bazovyi riven – Sumy, Universytetska knyha, 2013 rik. – 458 p.]
4. Фермер: професійний рівень – Суми, Університетська книга, 2014 рік. – 601 с. [Fermer: profesiynyi riven – Sumy, Universytetska knyha, 2014 rik. – 601 p.]
5. Технологія виробництва продукції свинарства / Засуха Ю.В., Нагаєвич В.М., Повод М.Г., Барановський Д.І. та ін Вінниця. Нова книга 2011р. 333с. [Tekhnolohiia vyrobnytstva produktsii svynarstva / Zasukha Yu.V., Nahaievych V.M., Povod M.H., Baranovskyi D.I. ta in Vinnytsia. Nova knyha 2011r. 333p.]
6. Свинарство (монографія) / Волощук В.М., Рибалко В.П., Повод М.Г та ін. - Київ Аграрна наука 2014 588с. [Svynarstvo (monohrafiia) / Voloshchuk V.M., Rybalko V.P., Povod M.H ta in. - Kyiv Ahrarna nauka 2014 588 p.]
7. Свинарство- селекція технологія/ Д.І. Барановський, В.І. Герасимов В.М. Нагаєвич та ін. - Харків.: Еспада, 2011.с.2011 [Svynarstvo- selektsiia tekhnolohiia/ D.I. Baranovskyi, V.I. Herasymov V.M. Nahaievych ta in.-Kharkiv.: Espada, 2011. p.2011]
8. Боголюбский С.И. Селекция сельскохозяйственной птицы. - М.: Агропромиздат, 2001. –285 с. [Boholiubskiyi S.Y. Seleksyia selskokhoziaistvennoi ptytsy. - M.: Ahropromyzdat, 2001. –285 p.]

9. Божко П.Е. Технология производства яиц и мяса птицы на промышленной основе. – М.: Колос, 2004. – 366 с. [Bozhko P.E. Tekhnolohyia proyzvodstva yaysy u miasa ptytсы na promyshlennoi osnovе. – М.: Kolos, 2004. – 366 p.]

#### *Supplementary literature*

1. Генетика, селекція і біотехнологія в скотарстві/М.В. Зубец, В.П. Буркат, Ю.Ф. Мельник і др. – К.: «БМП», 2007. – 722 с. [Henetyka, selektsyia y byotekhnolohyia v skotovodstve/M.V. Zubets, V.P. Burkat, Yu.F. Melnyk y dr. – К.: «ВМР», 2007. – 722 p.]
2. Рубан Ю.Д. Скотарство і технологія виробництва молока та яловичини. 2003. – 386 с. [Ruban Yu.D. Skotarstvo i tekhnolohiia vyrobnytstva moloka ta yalovychynu. 2003. – 386 p.]
3. Рубан Ю.Д.Породы, породообразовательный процесс и селекция животных. – К.: Аграрна наука, 2006. – 380 с. [Ruban Yu.D.Porody, porodoobrazovatelnyi protsess y selektsyia zhyvotnykh. – К.: Ahrarna nauka, 2006. – 380 p.]
4. Інструкція по бонітуванню великої рогатої худоби молочних порід . К.: Урожай,2004. – 76 с. [Instruktsiia po bonituvanniu velykoi rohatoi khudoby molochnykh porid . К.: Urozhai,2004. – 76 p.]
5. Свинарство і технологія виробництва свинини / В.І. Герасимов, Л.М. Цицюрський, Д.І. Барановський та ін. - Харків: Еспада, 2003. - 448 с. [Instruktsiia po bonituvanniu velykoi rohatoi khudoby molochnykh porid . К.: Urozhai,2004. – 76 p.]
6. Герасимов В. І., Коваленко Б. П., Нагаєвич В .М., Походня В.М. та ін . Довідник з виробництва свинини .-Харків.: Еспада, 2001.-336 с. [Herasymov V. I., Kovalenko B. P., Nahaievych V .M., Pokhodnia V.M. ta in . Dovidnyk z vyrobnytstva svynynu .-Kharkiv.: Espada, 2001.-336 p.]
7. Ковалёв Л.Ю., Фатеев В.Н. Породы, линии и кроссы сельскохозяйственной птицы. – М.: Колос, 2003.[ Kovalyov L.YU., Fateev V.N. Porody, linii i krossy sel'skohozyajstvennoj pticy. – М.: Kolos, 2003.]
8. Кочиш И.И. Селекция в птицеводстве. – М.: Колос, 2002. [Kochish I.I. Seleksiya v pticevodstve. – М.: Kolos, 2002.]

#### *Scientific and research journals:*

Пропозиція [Propozytsiia];  
Ефективне тваринництво [Efektyvne tvarynnytstvo];  
Молоко і ферма [Moloko i ferma];  
Агроексперт [Aghroekspert];  
Про корів [Pro koriv].

#### *Electronic resources*

[www. propozitsiya.com](http://www.propozitsiya.com)  
[www.agroexpert.ua](http://www.agroexpert.ua)  
[www. magazine.milkua.info](http://www.magazine.milkua.info)  
[agroyug.ru/agro-2/nomer/arhiv.html](http://agroyug.ru/agro-2/nomer/arhiv.html)

latifundist.com

kurkul.com

www.poettinger.at

www.gea-ukraine.com

bratslav.com

ukrstat.gov.ua

sumystat.sumy.ua