**NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE**

Department of Occupational Safety and Biotechnical Systems in Animal Husbandry

**APPROVED**
Faculty of Agrarian Management
"29" May 2026

# CURRICULUM OF ACADEMIC DISCIPLINE

# AGRICULTURAL SYSTEMS AND SUSTAINABLE DEVELOPMENT

Area of knowledge D “Business, Administration and Law”
Specialty D5 “Marketing”
Educational program “Marketing”
Faculty of Agrarian Management
Developed by: PhD, As. Prof, Bohdan MAZURENKO,
PhD, As. Prof, Borys ONYSHCHENKO,
PhD, Senior Lecturer, Mykhailo MATVIEIEV,
PhD, As. Prof, Victor REBENKO

Kyiv – 2026

## Description of the discipline

The course “Agrosystems and Sustainable Development” is a required component of the bachelor’s degree program in “Marketing.” This course defines the uniqueness of the educational program and is aimed at helping future marketers develop a comprehensive understanding of the specifics of the agricultural sector. It is designed to help students understand the mechanisms of effective management of technological processes in crop and livestock production; criteria for evaluating, selecting, and developing modern technological processes, as well as justifying rational sets of machinery and equipment; a methodology for forecasting the future development of agricultural sectors; and the creation of standard working conditions and the prevention of workplace injuries in agriculture.

| **Area of knowledge, academic degree, specialty, educational programme** | | |
|---|---|---|
| Area of knowledge | *D “Business, Administration and Law”* | |
| Academic degree | *Bachelor’s* | |
| Specialty | *D5 “Marketing”* | |
| Educational programme | *Agrosystems and Sustainable Development* | |
| **Characteristics of the discipline** | | |
| Type | *compulsory* | |
| Total number of hours | *240* | |
| Number of ECTS credits | *8* | |
| Number of modules | *6* | |
| Course project (work) (if any) | - | |
| Form of assessment | *exam* | |
| **Indicators of the discipline for full-time and part-time forms of university study** | | |
| | **University study** | |
| | Full-time | Part-time |
| Year of study | 1 | 1 |
| Term | 1 | 1 |
| Lectures | *60 hours* | *12 hours* |
| Practical classes and seminars | *60 hours* | *8 hours* |
| Laboratory classes | - | - |
| Self-study | *120 hours* | *220 hours* |
| Number of hours per week for full-time students | *8 hours* | - |

## Aim, prerequisites, competences and expected learning outcomes of thediscipline

**Aim** of this course is to equip students with a system of knowledge, skills, and practical abilities regarding the rational selection and effective application of modern technologies in agribusiness, the production of high-quality and environmentally friendly agricultural products while minimizing energy and labor costs, and achieving maximum productivity (maximum output per unit of time per unit of area). This

requires the widespread implementation of intensive, energy- and resource-efficient, as well as environmentally sound technologies in agromarketing practice.

**Prerequisites of the discipline «Agrosystems and Sustainable Development» (if any)**

***Acquisition of competences:***

**Integral competence (IC)**: The ability to solve complex specialised tasks and practical problems in the field of marketing or in the learning process, which involves the application of relevant theories and methods and is characterised by complexity and uncertainty of conditions.

**General competencies (GC)**:

GC1 — The ability to exercise one's rights and fulfill one's duties as a member of society; to recognize the values of a civil (free and democratic) society and the need for its sustainable development, the rule of law, and human and civil rights and freedoms in Ukraine.

GC2 — The ability to preserve and enhance the moral, cultural, and scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the overall system of knowledge about nature and society, and in the development of society, engineering, and technology; and to use various types and forms of physical activity for active recreation and leading a healthy lifestyle.

GC4 — Ability to learn and acquire contemporary knowledge

GC6 — Knowledge and understanding of the subject area and understanding of professional practice

GC7 — Ability to apply knowledge in practical situations

GC14 — Ability to act in a socially responsible and conscious manner

**Special (professional) competences (SC)**:

SC4 — The ability to conduct marketing activities based on an understanding of the essence and content of marketing theory and the functional relationships among its components

SC5 — The ability to correctly apply marketing methods, techniques, and tools

SC14 — The ability to propose improvements to marketing functions

**Expected Learning Outcomes (ELO)**:

ELO12 — Demonstrate skills in independent work, flexible thinking, and openness to new knowledge; be critical and self-critical

ELO16 — Meet the requirements expected of a modern marketer; enhance one's professional competence

ELO19 — Demonstrate skills in developing a company's marketing policy; apply modern methods, concepts, and tools in product marketing, pricing, sales, communications, consumer behavior research, and target audience identification to determine the development prospects of market participants

**Programme and structure of the discipline**

| Modulesand topics | Number of hours | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | full-time | | | | | | part-time | | | | | |
| | total | including | | | | | total | including | | | | |
| | | l | p | lab | ind | s.st | | l | p | lab | ind | s.st |
| Module 1. **Modern Approaches to the Use of Marketing in the Field of Crop Production** | | | | | | | | | | | | |
| Topic 1. Crop Production as a Driver of Agricultural Sector Development: Science and Practice. Sustainable Development of Crop Production in Ukraine and Worldwide. | 8 | 2 | 2 | | | 4 | 8 | 1 | | | | 7 |
| Topic 2. Grain Products: Types, Characteristics, and Commercialization Opportunities | 8 | 2 | 2 | | | 4 | 8 | | 1 | | | 7 |
| Topic 3. Marketing-Based Management of Wheat Production in the Context of Agrosystems and Sustainable Development | 8 | 2 | 2 | | | 4 | 8 | | | | | 8 |
| Topic 4. Early- and Late-Maturing Spring Cereals: Their Market Role and Significance for the Sustainable Development of Ukraine's Agricultural Sector | 8 | 2 | 2 | | | 4 | 8 | | | | | 8 |
| Topic 5. Market-driven approaches to growing peas and soybeans in sustainable agricultural systems | 8 | 2 | 2 | | | 4 | 8 | 1 | | | | 7 |
| ***Total for module 1*** | ***40*** | ***10*** | ***10*** | | | ***20*** | ***40*** | ***2*** | ***1*** | | | ***37*** |
| Module 2. **Organizing the cultivation of industrial crops (raw materials) for the processing industry** | | | | | | | | | | | | |
| Topic 1. Tuber Crops: From Production to Market – Marketing Tools in Sustainable Agricultural Systems | 9 | 2 | 2 | | | 5 | 9 | | 1 | | | 8 |
| Topic 2. Root Crops in Sustainable Agricultural Systems: A Focus on Sugar Beets and Ukraine's Sugar Market | 9 | 2 | 2 | | | 5 | 9 | | | | | 9 |
| Topic 3. The Role of Oilseeds: An International Perspective and Ukraine's Role in Sustainable Agricultural Systems | 9 | 2 | 2 | | | 5 | 9 | 1 | | | | 8 |
| Topic 4. Sunflower and Rapeseed Cultivation: Factors Affecting Efficiency in Sustainable Agricultural Systems | 9 | 2 | 2 | | | 5 | 9 | | | | | 9 |
| ***Total for module 2*** | ***36*** | ***8*** | ***8*** | | | ***20*** | ***36*** | ***1*** | ***1*** | | | ***34*** |
| Module 3. **Sustainable Agricultural Engineering Systems and Safety in Crop Production** | | | | | | | | | | | | |
| Topic 1. Mechanization of Agricultural Systems: Equipment for Soil Tillage, Fertilizer Application, and Seeding | 7 | 2 | 2 | | | 3 | 7 | 1 | | | | 6 |
| Topic 2. Agricultural Engineering | 7 | 2 | 2 | | | 3 | 7 | 1 | | | | 6 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technologies: Plant Protection and Crop Harvesting as Factors in the Efficiency of Agricultural Systems. | | | | | | | | | | | | |
| Topic 3. Agricultural Machinery for Post-Harvest Processing and Harvesting: Effective Solutions for Sustainable Agricultural Systems | 7 | 2 | 2 | | | 3 | 7 | | 1 | | | 6 |
| Topic 4. Modern Harvesting Technologies for Root Crops and Fruit and Berry Crops in Sustainable Agricultural Systems | 7 | 2 | 2 | | | 3 | 7 | | | | | 7 |
| Topic 5. Occupational Safety System in Crop Production: Modern Approaches and Safety Standards | 8 | 2 | 2 | | | 4 | 8 | 1 | | | | 7 |
| Topic 6. Occupational Safety When Working with Agricultural Machinery: Modern Approaches and Standards | 8 | 2 | 2 | | | 4 | 8 | | 1 | | | 7 |
| ***Total for module 3*** | ***44*** | ***12*** | ***12*** | | | ***20*** | ***44*** | ***3*** | ***2*** | | | ***39*** |
| Module 4. **The Biological Potential of Farm Animals, Biosafety, and Sustainable Feed Systems** | | | | | | | | | | | | |
| Topic 1. Ontogenesis (individual development) of animals and factors influencing the development of viability in changing ecosystems | 9 | 2 | 2 | | | 5 | 9 | 1 | | | | 8 |
| Topic 2. Breeding, livestock breeding programs, and the conservation of genetic diversity in farm animals | 9 | 2 | 2 | | | 5 | 9 | | | | | 9 |
| Topic 3. Environmental Assessment of Feed and Optimization of Its Chemical Composition | 9 | 2 | 2 | | | 5 | 9 | 1 | | | | 8 |
| Topic 4. Precision and controlled feeding systems to reduce the environmental impact | 9 | 2 | 2 | | | 5 | 9 | | 1 | | | 8 |
| ***Total for module 4*** | ***36*** | ***8*** | ***8*** | | | ***20*** | ***36*** | ***2*** | ***1*** | | | ***33*** |
| Module 5. **Environmentally Friendly and Ethical Technologies for Livestock Production in Closed Agrosystems** | | | | | | | | | | | | |
| Topic 1. Sustainable Milk Production Technology and the Concept of Animal Welfare | 8 | 2 | 2 | | | 4 | 8 | 1 | | | | 7 |
| Topic 2. Resource-saving technologies for the ecological beef production | 8 | 2 | 2 | | | 4 | 8 | | | | | 8 |
| Topic 3. Environmentally Friendly Technologies in Swine and Sheep Farming | 8 | 2 | 2 | | | 4 | 8 | | 1 | | | 7 |
| Topic 4. Established Technology in Poultry Farming: Egg and Poultry Meat Production | 8 | 2 | 2 | | | 4 | 8 | | | | | 8 |
| Topic 5. Sustainable development of niche areas of animal husbandry: from horse breeding to beekeeping | 8 | 2 | 2 | | | 4 | 8 | | | | | 7 |
| ***Total for module 5*** | ***40*** | ***10*** | ***10*** | | | ***20*** | ***40*** | ***1*** | ***1*** | | | ***38*** |
| Module 6. **Resource-Efficient Technical Support and Management of Risks and Occupational Safety in Sustainable Livestock Farming** | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Topic 1. Energy-Efficient Water Supply and Irrigation Systems | 7 | 2 | 2 | | | 3 | 7 | | 1 | | | 6 |
| Topic 2. Mechanization of Precise Feed Preparation and Distribution | 7 | 2 | 2 | | | 3 | 7 | 1 | | | | 6 |
| Topic 3. Circular Waste Management: Removal, Transportation, and Disposal of Manure | 7 | 2 | 2 | | | 3 | 7 | | 1 | | | 6 |
| Topic 4. Innovative and Digital Technologies for Livestock Production | 7 | 2 | 2 | | | 3 | 7 | 1 | | | | 6 |
| Topic 5. Ukrainian Legislation on Occupational Safety and Health and the Social Dimension of Sustainable Development | 8 | 2 | 2 | | | 4 | 8 | 1 | | | | 7 |
| Topic 6. Workplace Safety, Ergonomics, and Risk Prevention in Mechanized Processes in Sustainable Livestock Farming | 8 | 2 | 2 | | | 4 | 8 | | | | | 5 |
| ***Total for module 6*** | ***44*** | ***12*** | ***12*** | | | ***20*** | ***44*** | ***3*** | ***2*** | | | ***39*** |
| **Total hours** | **240** | **60** | **60** | | | **120** | **240** | **12** | **8** | | | **220** |

## Topics of lectures

| № | Topic title | Hours |
|---|---|---|
| 1. | Crop Production as a Driver of Agricultural Sector Development: Science and Practice. Sustainable Development of Crop Production in Ukraine and Worldwide. | 2 |
| 2. | Grain Crops: Types, Characteristics, and Commercialization Opportunities | 2 |
| 3. | Marketing-Based Management of Wheat Production in the Context of Agrosystems and Sustainable Development | 2 |
| 4. | Early- and late-maturing spring grains: market role and significance for the sustainable development of Ukraine’s agricultural sector | 2 |
| 5. | Market-driven approaches to growing peas and soybeans in sustainable agrosystems | 2 |
| 6. | Tuber crops: from production to market—marketing tools in sustainable agrosystems | 2 |
| 7. | Root crops in sustainable agricultural systems: a focus on sugar beets and the Ukrainian sugar market | 2 |
| 8. | The role of oilseeds in the international context and Ukraine’s role in sustainable agricultural systems | 2 |
| 9. | Sunflower and rapeseed cultivation: factors influencing efficiency in sustainable agricultural systems | 2 |
| 10. | Mechanization of agricultural systems: equipment for soil cultivation, fertilizer application, and seeding | 2 |
| 11. | Agricultural engineering technologies: plant protection and crop harvesting as factors in the efficiency of agricultural systems. | 2 |
| 12. | Agricultural machinery for post-harvest processing and crop harvesting: effective solutions for sustainable agricultural systems | 2 |
| 13. | Modern technologies for harvesting root crops and fruit and berry crops in sustainable agricultural systems | 2 |
| 14. | Occupational safety system in crop production: modern approaches and safety standards | 2 |

| | | |
|---|---|---|
| 15. | Occupational safety when working with agricultural machinery: modern approaches and standards | 2 |
| 16. | Ontogenesis (individual development) of animals and factors influencing viability in changing ecosystems | 2 |
| 17. | Breeding, livestock management, and the conservation of genetic diversity in farm animals | 2 |
| 18. | Ecological assessment of feed and optimization of its chemical composition | 2 |
| 19. | Precision and ration-based feeding systems to reduce environmental impact | 2 |
| 20. | Sustainable milk production technology and the concept of animal welfare | 2 |
| 21. | Resource-efficient technologies for the production of organic beef | 2 |
| 22. | Eco-friendly technologies in swine and sheep farming | 2 |
| 23. | Sustainable technologies in poultry farming: egg and poultry meat production | 2 |
| 24. | Sustainable development of niche livestock sectors: from horse breeding to beekeeping | 2 |
| 25. | Energy-Efficient Water Supply and Drinking Systems | 2 |
| 26. | Mechanization of Precise Feed Preparation and Distribution | 2 |
| 27. | Circular Waste Management: Removal, Transportation, and Utilization of Manure | 2 |
| 28. | Innovative and Digital Technologies for Livestock Production | 2 |
| 29. | Ukrainian legislation on occupational safety and the social dimension of sustainable development | 2 |
| 30. | Occupational safety, ergonomics, and risk prevention in mechanized processes in sustainable livestock farming | 2 |
| | **Total** | **60** |

## Topics of practical classes

| № | Topic title | Hours |
|---|---|---|
| 1. | Renewable Resources in Agricultural Systems: Seeds, Fertilizers, Pesticides | 2 |
| 2. | Cereal Crops: Biology, Morphology, and Life Cycle in Sustainable Agricultural Systems | 2 |
| 3. | Wheat as a Key Grain Crop: Botany and Morphology in Sustainable Agricultural Systems | 2 |
| 4. | Biology and morphology of maize in the context of sustainable agricultural development | 2 |
| 5. | Leguminous crops: growth biology and agronomic factors of development in sustainable agrosystems | 2 |
| 6. | Morphology and botanical characteristics of tuber crops in the context of sustainable agricultural production | 2 |
| 7. | Root crops as a component of agrosystems: agrobiological characteristics and production significance | 2 |
| 8. | Oilseed crops: agrobiological basis and production significance in sustainable agrosystems | 2 |
| 9. | The Asteraceae family: morphological structure and practical significance | 2 |
| 10. | Modern agricultural technologies: research on equipment for soil cultivation, fertilization, and seeding in sustainable agricultural systems | 2 |
| 11. | Agricultural engineering systems: plant protection, forage harvesting, and crop harvesting in sustainable agricultural production | 2 |
| 12. | Agricultural engineering technologies for post-harvest processing and crop | 2 |

| | | |
|---|---|---|
| | harvesting in sustainable agricultural production | |
| 13. | Modern Agricultural Technologies: Research on Machinery for Harvesting Root Crops, Flax, Vegetables, and Berries in Sustainable Agricultural Systems | 2 |
| 14. | Assessment of the Microclimate of the Work Environment in the Context of Sustainable Agribusiness Development | 2 |
| 15. | Primary Fire Extinguishing Equipment: Modern Approaches to Safety in the Agricultural Sector | 2 |
| 16. | Digital Systems for Production and Breeding Records in Animal Husbandry | 2 |
| 17. | Innovative Methods for Identifying, Registering, and Tagging Animals in the Smart Farming System | 1 |
| 18. | Monitoring and Modeling Animal Growth Dynamics to Assess Feed Conversion Efficiency | 1 |
| 19. | Ecological classification and determination of feed nutritional value and safety | 2 |
| 20. | Development of precision feeding rations and calculation of feed requirements | 2 |
| 21. | Sustainable milk production technology: digital methods for recording, evaluating, and managing quality | 2 |
| 22. | Technology for producing organic beef: in-life and post-slaughter assessment of meat quality | 2 |
| 23. | Eco-friendly pork production technology: comprehensive assessment (grading) and welfare standards | 1 |
| 24. | Sustainable technologies in sheep and goat farming: accounting and ecological certification of wool and down | 1 |
| 25. | Poultry farming technologies: monitoring egg production and calculating the ecological and economic efficiency of egg production | 2 |
| 26. | Beekeeping as a factor in the stability of agroecosystems: production technologies and calculating pollination needs | 2 |
| 27. | Niche rabbit farming and fur animal husbandry: commercial evaluation of raw materials in the context of ethical standards | 1 |
| 28. | Energy-efficient systems for water supply and watering | 2 |
| 29. | Resource-saving equipment for feed preparation, precise dosing, and distribution | 2 |
| 30. | Circular systems for manure collection, removal, and separation | 2 |
| 31. | Automated milking systems and robotic complexes. Shearing units | 2 |
| 32. | Organization of occupational safety training and the “Vision Zero” (zero injuries) concept in agribusiness | 2 |
| 33. | Risk Analysis, Investigation, and Prevention of Accidents at Automated Livestock Facilities | 2 |
| | **Total** | **60** |

## Topics of self-study

| № | Topic title | Hours |
|---|---|---|
| 1. | Pseudocereals as a Promising Segment: Biological Characteristics and Significance for Sustainable Development | 20 |
| 2. | Essential Oil Crops: Role and Development in Modern Agrosystems | 20 |
| 3. | Adjusting Machinery for Soil Tillage, Fertilizer Application, and Crop Seeding | 20 |

| | | |
|---|---|---|
| 4. | Features of ontogenesis (individual development) in animals under conditions of anthropogenic stress and climate change | 20 |
| 5. | Eco-friendly and sustainable technologies in animal husbandry: from traditional sectors to niche agribusiness | 20 |
| 6. | Ecological Design: A Master Plan for an Eco-Farm, Taking into Account Sanitary Protection Zones and Landscape Design | 20 |
| | **Total** | **120** |

## Methods of assessing expected learning outcomes:

- oral or written survey;
- interview;
- test;
- defending practical, design/graphical works, projects;

## Teaching methods:

- problem-based method;
- practice oriented studying method;
- research based method;
- team work, brainstorm method;

## Results assessment

The student's knowledge is assessed by means of a 100-point scale converted into the national grades according to the "Exam and Credit Regulations at NULES of Ukraine" in force

## Distribution of points by types of educational activities

| Educational activity | Results | Assessment |
|---|---|---|
| Module 1. **Modern Approaches to the Use of Marketing in the Field of Crop Production** | | |
| Practical class 1. Renewable Resources in Agricultural Systems: Seeds, Fertilizers, Pesticides | ELO 12, ELO 16, ELO 19. Understand contemporary marketing concepts in the agricultural sector, analyze the market and consumers, and apply innovative marketing tools to promote the sustainable development of agricultural systems. Be able to develop marketing strategies, conduct market research, identify target audiences, and plan marketing activities with a focus on sustainable development. | 11 |
| Practical class 2. Cereal Crops: Biology, Morphology, and Life Cycle in Sustainable Agricultural Systems | | 11 |
| Practical class 3. Wheat as a Key Grain Crop: Botany and Morphology in Sustainable Agricultural Systems | | 11 |
| Practical class 4. Biology and morphology of maize in the context of sustainable agricultural development | | 11 |
| Practical class 5. Leguminous crops: growth biology and agronomic factors of development in sustainable agrosystems | | 11 |
| Self-study 1. | | 15 |
| Module control 1. | | 30 |
| **Total for module 1** | | **100** |
| Module 2. **Organizing the cultivation of industrial crops (raw materials) for the processing industry** | | |
| Practical class 1. Morphology and botanical characteristics of tuber crops in the context of | ELO 12, ELO 16, ELO 19. Understand the specifics of growing industrial | 15 |

| | | |
|---|---|---|
| sustainable agricultural production | crops, modern technologies, and marketing approaches to their sale. Be able to plan and analyze cultivation processes, conduct market research, and develop proposals for the processing industry, taking sustainable development into account. | |
| Practical class 2. Root crops as a component of agrosystems: agrobiological characteristics and production significance | | 15 |
| Practical class 3. Oilseed crops: agrobiological basis and production significance in sustainable agrosystems | | 15 |
| Practical class 4. The Asteraceae family: morphological structure and practical significance | | 15 |
| Self-study 2. | | 10 |
| Module control 2. | | 30 |
| **Total for module 2** | | **100** |
| Module 3. **Sustainable Agricultural Engineering Systems and Safety in Crop Production** | | |
| Practical class 1. Modern agricultural technologies: research on equipment for soil cultivation, fertilization, and seeding in sustainable agricultural systems | ELO 12, ELO 16, ELO 19. Be familiar with modern engineering solutions for the sustainable development of agricultural systems, occupational safety, and environmental protection. Be able to apply innovative technologies, plan safe technological processes, and analyze their impact on sustainable development. | 10 |
| Practical class 2. Agricultural engineering systems: plant protection, forage harvesting, and crop harvesting in sustainable agricultural production | | 10 |
| Practical class 3. Agricultural engineering technologies for post-harvest processing and crop harvesting in sustainable agricultural production | | 10 |
| Practical class 4. Modern Agricultural Technologies: Research on Machinery for Harvesting Root Crops, Flax, Vegetables, and Berries in Sustainable Agricultural Systems | | 10 |
| Practical class 5. Assessment of the Microclimate of the Work Environment in the Context of Sustainable Agribusiness Development | | 10 |
| Practical class 6. Primary Fire Extinguishing Equipment: Modern Approaches to Safety in the Agricultural Sector | | 10 |
| Self-study 3. | | 10 |
| Module control 3. | | 30 |
| **Total for module 3** | | **100** |
| Module 4. **The Biological Potential of Farm Animals, Biosafety, and Sustainable Feed Systems** | | |
| Practical class 1. Digital Systems for Production and Breeding Records in Animal Husbandry | ELO 12, ELO 16, ELO 19. Understand the biological characteristics of animals, modern approaches to biosafety, and sustainable feed supply. Be able to analyze biological potential, develop strategies to improve productivity and safety in animal husbandry, and apply modern technologies for sustainable development. | 10 |
| Practical class 2. Innovative Methods for Identifying, Registering, and Tagging Animals in the Smart Farming System | | 10 |
| Practical class 3. Monitoring and Modeling Animal Growth Dynamics to Assess Feed Conversion Efficiency | | 10 |
| Practical class 4. Ecological classification and determination of feed nutritional value and safety | | 10 |
| Practical class 5. Development of precision feeding rations and calculation of feed requirements | | 10 |
| Self-study 4. | | 20 |
| Module control 4. | | 30 |
| **Total for module 4** | | **100** |
| Module 5. **Environmentally Friendly and Ethical Technologies for Livestock Production in Closed Agrosystems** | | |
| Practical class 1. Sustainable milk production technology: digital methods for recording, | ELO 12, ELO 16, ELO 19. Be familiar with modern ethical and | 10 |

| | | |
|---|---|---|
| evaluating, and managing quality | environmentally friendly technologies in livestock production and their impact on sustainable development. Be able to apply environmentally friendly technologies, analyze their advantages and disadvantages, and develop responsible approaches to livestock production. | |
| Practical class 2. Technology for producing organic beef: in-life and post-slaughter assessment of meat quality | | 10 |
| Practical class 3. Eco-friendly pork production technology: comprehensive assessment (grading) and welfare standards | | 10 |
| Practical class 4. Sustainable technologies in sheep and goat farming: accounting and ecological certification of wool and down | | 10 |
| Practical class 5. Poultry farming technologies: monitoring egg production and calculating the ecological and economic efficiency of egg production | | 10 |
| Practical class 6. Niche rabbit farming and fur animal husbandry: commercial evaluation of raw materials in the context of ethical standards | | 10 |
| Self-study 5. | | 10 |
| Module control 5. | | 30 |
| **Total for module 5** | | **100** |
| Module 6. **Resource-Efficient Technical Support and Management of Risks and Occupational Safety in Sustainable Livestock Farming** | | |
| Practical class 1. Energy-efficient systems for water supply and watering | ELO 12, ELO 16, ELO 19. Be familiar with modern resource- and energy-efficient technologies, as well as methods of risk management and occupational safety in sustainable animal husbandry. Be able to plan and implement resource- and energy-saving technologies, analyze risks, and ensure safe working conditions. | 10 |
| Practical class 2. Resource-saving equipment for feed preparation, precise dosing, and distribution | | 10 |
| Practical class 3. Circular systems for manure collection, removal, and separation | | 10 |
| Practical class 4. Automated milking systems and robotic complexes. Shearing units | | 10 |
| Practical class 5. Organization of occupational safety training and the “Vision Zero” (zero injuries) concept in agribusiness | | 10 |
| Practical class 6. Risk Analysis, Investigation, and Prevention of Accidents at Automated Livestock Facilities | | 10 |
| Self-study 6. | | 10 |
| Module control 6. | | 30 |
| **Total for module 6** | | **100** |
| **Class work** | **(M1+M2+ M3+M4+ M5+M6)/6*0,7 ≤ 70** | |
| **Exam/credit** | | **30** |
| **Total for year** | **(Class work + exam) ≤ 100** | |

## Scale for assessing student’s knowledge

| Student’s rating, points | National grading (exam/credits) |
|---|---|
| 90-100 | excellent |
| 74-89 | good |
| 60-73 | satisfactory |
| 0-59 | unsatisfactory |

## Assessment policy

| | |
|---|---|
| ***Deadlines and exam retaking*** | Works that are submitted late without valid reasons will be assessed with a lower grade. Module tests may be retaken with the permission of the lecturer |

| | |
|---|---|
| ***rules*** | if there are valid reasons (e.g. a sick leave). |
| ***Academic integrity rules*** | Cheating during tests and exams is prohibited (including using mobile devices). Term papers and essays must have correct references to the literature used |
| **Attendance rules** | Attendance is compulsory. For good reasons (e.g. illness, international internship), training can take place individually (online by the faculty dean's consent) |

## Teaching and learning aids

1. Electronic course of the discipline "Systems of Technologies: Livestock Farming" on the educational portal of NULES of Ukraine eLearn. URL: https://elearn.nubip.edu.ua/course/view.php?id=369
2. Technology of Animal Products Production. The Practical guide for laboratory classes for the students of economical majors (for group with intensive English learning). – 2017.
3. V. Khmelovskyi, V. Bratishko, O. Achkevych, V. Rebenko, O. Zabolotko, S. Potapova, V. Achkevych, O. Solomka Machinery and equipment for livestock / Textbook. – Kyiv. NULES, 2022, 229 p.
4. Rebenko V.I., Achkevych O.M., Potapova S.E. Methodical instructions for seminars in the discipline "Systems of Technologies: Livestock Farming" (Farm mechanization, Labor safety) for applicants for the first (bachelor's) level of education in the specialty 073 'Management', educational program "Management". - Kyiv: NULES of Ukraine. 2025. 48 c.
5. Шуле Г., Пфафф С., Ващенко П., Лавріненко І., Мазур Н., Гетя А., Кононенко Р., Матвєєв М., Якубець Т., Пархоменко Л., Стрижак Т., Дудник Т., Дудус Т., Гетя О., Степура Л. Стале тваринництво та благополуччя тварин. Модуль 3 цифрове тваринництво. Електронний посібник. К.: «НМЦ ВФПО Агроосвіта», 2024. https://vukladach.pp.ua/MyWeb/manual/nmcvfpo/TSUFROVE_TVARUNNUSTVO_MODYL_3/Golovna/Golovna.htm
6. Ревенко І.І., Хмельовський В.С., Заболотько О.О., Потапова С.Є. та ін. Машини і обладнання для тваринництва. Електронний підручник. Науково-методичний центр вищої та фахової передвищої освіти, 2025. URL: https://nmcbook.com.ua/elepidruchnuk/motnmc/Golovna/Golovna.htm

## 10.Recommended sources of information


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