

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

Department of Plant Science

Department of Agricultural Machinery and Systems Engineering named after
Academician P. M. Vasylenko

Department of Occupational Safety and Biotechnical Systems in Animal Husbandry

"APPROVED"

Faculty of Agrarian Management

"22" June 2026

CURRICULUM OF ACADEMIC DISCIPLINE

Agrosystems and Sustainable Development

Area of knowledge **D Business, Administration and Law**

Specialty **D5 Marketing**

Educational programme Marketing

Faculty **Agrarian Management**

Developed by: **Liubov HONCHAR**, Candidate of Agricultural Science, As. prof.

Bohdan MAZURENKO, PhD, As. prof.

Svitlana POTAPOVA, Candidate of Technical Science, As. prof.

Borys ONISCHENKO, Candidate of Technical Science, As. prof.

Kyiv – 2026

Description of the discipline Agrosystems and Sustainable Development

The academic discipline "Agrosystems and Sustainable Development" is a compulsory component of bachelor training under the educational and professional programme "Marketing". This course determines the uniqueness of the educational programme and is aimed at forming in future marketers a comprehensive understanding of the specifics of the agricultural sector. It is aimed at developing students' understanding of the mechanism of effective management of technological processes in the fields of crop production and animal husbandry; criteria for assessing, selecting and developing modern technological processes, as well as substantiating rational sets of machinery and equipment; the methodology for forecasting the prospective development of agricultural sectors; creating standard working conditions and preventing occupational injuries in agriculture.

Area of knowledge, academic degree, specialty, educational programme		
Area of knowledge	<i>D Business, Administration and Law</i>	
Academic degree	<i>bachelor's,</i>	
Specialty	<i>D5 Marketing</i>	
Educational programme	<i>Marketing</i>	
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	Examination	
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 hrs.	12 hrs.
Practical classes and seminars	-	-
Laboratory classes	60 hrs.	8 hrs.
Self-study	120 hrs.	220 hrs.
Number of hours per week for full-time students	8 hrs.	-

1. Aim, prerequisites, competences and expected learning outcomes of the discipline

Aim. The purpose of studying the discipline is to form in higher education students a

system of knowledge, skills and practical abilities regarding the rational choice and effective application of modern technologies in agribusiness, the production of high-quality and environmentally clean agricultural products while minimizing energy and labour costs, provided that maximum productivity is achieved (maximum output per unit of time per unit area). This requires the broad introduction into the practice of agromarketing of intensive, energy- and resource-saving, as well as environmentally appropriate technologies.

Prerequisites of the discipline (if any): absent

Acquisition of competences:

Integral competence (IC): The ability to solve complex specialized tasks and practical problems in agronomy, involving the application of theories and methods of the relevant science and characterized by complexity and uncertainty of conditions.

General competences (GC):

GC1 - Ability to exercise one's rights and obligations as a member of society, to understand the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, and human and civil rights and freedoms in Ukraine.

GC2 - Ability to preserve and enhance the moral, cultural and scientific values and achievements of society on the basis of understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, engineering and technologies, and to use various types and forms of physical activity for active recreation and a healthy lifestyle.

GC4 - Ability to learn and master modern knowledge.

GC6 - Knowledge and understanding of the subject area and understanding of professional activity.

GC7 - Ability to apply knowledge in practical situations.

GC14 - Ability to act in a socially responsible and conscious manner.

Special (professional) competences (SC):

SC4 - Ability to conduct marketing activities based on an understanding of the essence and content of marketing theory and the functional relationships between its components.

SC5 - Ability to correctly apply marketing methods, techniques and tools.

SC14 - Ability to propose improvements to the functions of marketing activity.

Expected Learning Outcomes (ELO):

ELO12 - Demonstrate skills of independent work, flexible thinking, openness to new knowledge, and be critical and self-critical.

ELO16 - Meet the requirements placed on a modern marketer and improve the level of personal professional training.

ELO19 - Demonstrate skills in developing the marketing policy of an enterprise, apply modern methods, concepts and tools of marketing product policy, pricing, sales, communications, consumer behaviour research and target audience formation in order to determine prospects for the development of market actors.

2. Programme and structure of the discipline

Names of content modules and topics	Number of hours (full-time form)						Number of hours (part-time form)					
	l	lab	sem	pr	ind.	total	l	lab	sem	pr	ind.	total
Module 1. Modern Approaches to the Use of Marketing in 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.	2	-	-	2	-	4	1	-	-	-	8	9
Topic 2. Grain products: types, characteristics and commercialization opportunities	2	-	-	2	20	24	-	-	-	1	8	9
Topic 3. Management of wheat production based on marketing in the context of agrosystems and sustainable development	2	-	-	2	-	4	-	-	-	-	8	8
Topic 4. Early and late spring cereals: market role and importance for sustainable development of the agricultural sector of Ukraine	2	-	-	2	-	4	-	-	-	-	5	5
Topic 5. Market-driven approaches to pea and soybean cultivation in agrosystems of sustainable development	2	-	-	2	-	4	1	-	-	-	9	10
Total for module 1	10	0	0	10	20	40	2	0	0	1	38	41
Module 2. Organization of Growing Industrial Crops (Raw Materials) for the Processing Industry												
Topic 1. Tuber crops: from production to the market - marketing tools in sustainable agrosystems	2	-	-	2	-	4	-	-	-	1	7	8
Topic 2. Root crops in agrosystems of sustainable development: focus on sugar beet and the sugar market of Ukraine	2	-	-	2	-	4	-	-	-	-	8	8
Topic 3. The place of oilseed crops: the international context and the role of Ukraine in agrosystems of sustainable development	2	-	-	2	20	24	1	-	-	-	8	9
Topic 4. Growing sunflower and rapeseed: efficiency factors in agrosystems of sustainable development	2	-	-	2	-	4	-	-	-	-	7	7
Total for module 2	8	0	0	8	20	36	1	0	0	1	30	32
Module 3. Sustainable Agroengineering Systems and Life Safety in Crop Production												
Topic 1. Mechanization of agrosystems: machinery for soil tillage, fertilizer application and sowing	2	-	-	2	20	24	1	-	-	-	8	9
Topic 2. Agroengineering technologies: plant protection and crop harvesting as a factor of agrosystem efficiency.	2	-	-	2	-	4	1	-	-	1	8	10

Names of content modules and topics	Number of hours (full-time form)						Number of hours (part-time form)					
	l	lab	sem	pr	ind.	total	l	lab	sem	pr	ind.	total
Topic 3. Agricultural machinery for post-harvest processing and crop harvesting: effective solutions for sustainable agrosystems	2	-	-	2	-	4	-	-	-	-	9	9
Topic 4. Modern technologies for harvesting root crops and fruit and berry crops in sustainable agrosystems	2	-	-	2	-	4	-	-	-	-	8	8
Topic 5. Occupational safety system in crop production: modern approaches and safety standards	2	-	-	2	-	4	1	-	-	-	5	6
Topic 6. Occupational safety when working with agricultural mechanisms: modern approaches and standards	2	-	-	2	-	4	-	-	-	1	5	6
Total for module 3	12	0	0	12	20	44	3	0	0	2	43	48
Module 4. Biological Potential of Farm Animals, Biosafety and Sustainable Feed Supply Systems												
Topic 1. Ontogenesis (individual development) of animals and factors of viability formation in changing ecosystems	2	-	-	2	20	24	1	-	-	-	8	9
Topic 2. Selection, breeding work and preservation of genetic diversity of farm animals	2	-	-	2	-	4	-	-	-	-	8	8
Topic 3. Ecological assessment of feed and optimization of its chemical composition	2	-	-	2	-	4	1	-	-	-	5	6
Topic 4. Precision and standardized feeding systems to reduce environmental load	2	-	-	2	-	4	-	-	-	1	8	9
Total for module 4	8	0	0	8	20	36	2	0	0	1	29	32
Module 5. Ecologized and Ethical Technologies for Production of Animal Husbandry Products in Closed Agrosystems												
Topic 1. Sustainable milk production technology and the Animal Welfare concept	2	-	-	2	-	4	1	-	-	-	8	9
Topic 2. Resource-saving technologies for the production of ecological beef	2	-	-	2	-	4	-	-	-	-	8	8
Topic 3. Ecologized technologies in pig and sheep farming	2	-	-	2	-	4	-	-	-	1	6	7
Topic 4. Sustainable technologies in poultry farming: production of eggs and poultry meat	2	-	-	2	-	4	-	-	-	-	8	8
Topic 5. Sustainable development of niche areas of animal husbandry: from horse breeding to beekeeping	2	-	-	2	20	24	-	-	-	-	9	9

Names of content modules and topics	Number of hours (full-time form)						Number of hours (part-time form)					
	l	lab	sem	pr	ind.	total	l	lab	sem	pr	ind.	total
Total for module 5	10	0	0	10	20	40	1	0	0	1	39	41
Module 6. Resource-Saving Technical Support and Risk and Occupational Safety Management in Sustainable Animal Husbandry												
Topic 1. Energy-efficient water supply and watering systems	2	-	-	2	20	24	-	-	-	1	6	7
Topic 2. Mechanization of precise feed preparation and distribution	2	-	-	2	-	4	1	-	-	-	8	9
Topic 3. Circular waste management: removal, transportation and utilization of manure	2	-	-	2	-	4	-	-	-	1	8	9
Topic 4. Innovative and digital technologies for obtaining animal husbandry products	2	-	-	2	-	4	1	-	-	-	9	10
Topic 5. Ukrainian legislation on occupational safety and the social dimension of sustainable development	2	-	-	2	-	4	1	-	-	-	5	6
Topic 6. Labour safety, ergonomics and risk prevention in mechanized processes in sustainable animal husbandry	2	-	-	2	-	4	-	-	-	-	5	5
Total for module 6	12	0	0	12	20	44	3	0	0	2	41	46
Course project (paper)	-	-	-	-	-	-	-	-	-	-	-	-
Total hours	60	0	0	60	120	240	12	0	0	8	220	240

3. Topics of lectures

№	Topic title	Hours
1	Topic 1. Crop production as a driver of agricultural sector development: science and practice. Sustainable development of crop production in Ukraine and worldwide.	2
2	Topic 2. Grain products: types, characteristics and commercialization opportunities	2
3	Topic 3. Management of wheat production based on marketing in the context of agrosystems and sustainable development	2
4	Topic 4. Early and late spring cereals: market role and importance for sustainable development of the agricultural sector of Ukraine	2
5	Topic 5. Market-driven approaches to pea and soybean cultivation in agrosystems of sustainable development	2
6	Topic 6. Tuber crops: from production to the market - marketing tools in sustainable agrosystems	2
7	Topic 7. Root crops in agrosystems of sustainable development: focus on sugar beet and the sugar market of Ukraine	2
8	Topic 8. The place of oilseed crops: the international context and the role of Ukraine in agrosystems of sustainable development	2
9	Topic 9. Growing sunflower and rapeseed: efficiency factors in agrosystems of sustainable development	2
10	Topic 10. Mechanization of agrosystems: machinery for soil tillage, fertilizer application and sowing	2
11	Topic 11. Agroengineering technologies: plant protection and crop harvesting as a factor of agrosystem efficiency.	2
12	Topic 12. Agricultural machinery for post-harvest processing and crop harvesting: effective solutions for sustainable agrosystems	2
13	Topic 13. Modern technologies for harvesting root crops and fruit and berry crops in sustainable agrosystems	2
14	Topic 14. Occupational safety system in crop production: modern approaches and safety standards	2
15	Topic 15. Occupational safety when working with agricultural mechanisms: modern approaches and standards	2
16	Topic 16. Ontogenesis (individual development) of animals and factors of viability formation in changing ecosystems	2
17	Topic 17. Selection, breeding work and preservation of genetic diversity of farm animals	2
18	Topic 18. Ecological assessment of feed and optimization of its chemical composition	2

19	Topic 19. Precision and standardized feeding systems to reduce environmental load	2
20	Topic 20. Sustainable milk production technology and the Animal Welfare concept	2
21	Topic 21. Resource-saving technologies for the production of ecological beef	2
22	Topic 22. Ecologized technologies in pig and sheep farming	2
23	Topic 23. Sustainable technologies in poultry farming: production of eggs and poultry meat	2
24	Topic 24. Sustainable development of niche areas of animal husbandry: from horse breeding to beekeeping	2
25	Topic 25. Energy-efficient water supply and watering systems	2
26	Topic 26. Mechanization of precise feed preparation and distribution	2
27	Topic 27. Circular waste management: removal, transportation and utilization of manure	2
28	Topic 28. Innovative and digital technologies for obtaining animal husbandry products	2
29	Topic 29. Ukrainian legislation on occupational safety and the social dimension of sustainable development	2
30	Topic 30. Labour safety, ergonomics and risk prevention in mechanized processes in sustainable animal husbandry	2

4. Topics of laboratory (practical, seminar) classes

№ з/п	Topic title	Hours
1	Revolving resources in agrosystems: seeds, fertilizers, pesticides	2
2	Cereal crops: biology, morphology and life cycle in sustainable agrosystems	2
3	Wheat as a key grain crop: botany and morphology in agrosystems of sustainable development	2
4	Biology and morphology of maize in the system of sustainable development of the agricultural sector	2
5	Leguminous crops: growth biology and agronomic development factors in sustainable agrosystems	2
6	Morphology and botanical characteristics of tuber crops in the context of sustainable agricultural production	2
7	Root crops as an element of agrosystems: agrobiological characteristics and production significance	2
8	Oilseed crops: agrobiological basis and production significance in sustainable agrosystems	2
9	Family Asteraceae: morphological structure and practical significance	2
10	Modern agrotechnologies: study of machinery for soil tillage, nutrition and sowing in sustainable agrosystems	2
11.	Agroengineering systems: plant protection, forage harvesting and crop	2

	harvesting in sustainable agricultural production	
12	Agroengineering technologies for post-harvest processing and harvesting of crops in sustainable agricultural production	2
13	Modern agrotechnologies: study of machines for harvesting root crops, flax, vegetables and berries in sustainable agrosystems	2
14	Assessment of the microclimate of the working environment under conditions of sustainable agribusiness development	2
15	Primary fire extinguishing equipment: modern approaches to safety in the agricultural sector	2
16	Digital systems of production and breeding records in animal husbandry	2
17	Innovative methods of identification, registration and marking of animals in the Smart Farming system	1
18	Monitoring and modelling the dynamics of animal growth to assess feed conversion efficiency	1
19	Ecological classification and determination of nutritional value and safety of feed	2
20	Development of precision feeding rations and calculation of feed requirements	2
21	Sustainable milk production technology: digital methods of recording, assessment and quality management	2
22	Technology for production of ecological beef: lifetime and post-slaughter assessment of meat quality	2
23	Ecologized pork production technology: comprehensive assessment (bonitation) and welfare standards	1
24	Sustainable technologies in sheep and goat breeding: accounting and ecological certification of wool and down	1
25	Poultry farming technologies: egg-laying records and calculation of the ecological and economic efficiency of egg production	2
26	Beekeeping as a factor of agroecosystem stability: production technologies and calculation of pollination needs	1
27	Niche rabbit breeding and fur farming: commodity assessment of raw materials in the context of ethical standards	1
28	Energy-efficient means for water supply and watering	2
29	Resource-saving units for preparation, precise dosing and distribution of feed	2
30	Circular systems for cleaning, removal and separation of manure	2
31	Automated milking installations and robotic complexes. Shearing units	2
32	Organization of occupational safety training and the "Vision Zero" concept (zero injuries) in agribusiness	2
33	Risk analysis, investigation and prevention of accidents at automated animal husbandry facilities	2

5. Topics of self-study

№	Topic title	Hours
1	Pseudocereals as a promising segment: biological features and significance for sustainable development	20
2	Essential oil crops: role and development in modern agrosystems	20
3	Adjustment of a machine for soil tillage, fertilizer application and sowing of agricultural crops	20
4	Features of ontogenesis (individual development) of animals under conditions of technogenic load and climate change	20
5	Ecologized and sustainable technologies in animal husbandry: from traditional sectors to niche agribusiness	20
6	Ecological design: master plan of an eco-farm with consideration of sanitary protection zones and landscape design	20

6. Methods of assessing expected learning outcomes:

- Oral or written questioning
- Interview
- Testing
- Defense of laboratory works

7. Teaching methods:

- Problem-based learning
- Practice-oriented learning
- Lecture
- Practical class
- Learning through research

8. 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

8.1. Distribution of points by types of educational activities

Topic	Learning outcomes	Assessment points
Module 1. Modern Approaches to the Use of Marketing in Crop Production		
Laboratory work. Revolving resources in agrosystems: seeds, fertilizers, pesticides	PLO 12, PLO 16, PLO 19. Know modern concepts of marketing in the agricultural sector, analyse the	11
Laboratory work. Cereal crops: biology,		11

Topic	Learning outcomes	Assessment points
morphology and life cycle in sustainable agrosystems	market and consumers, and apply innovative marketing tools for the sustainable development of agrosystems. Be able to develop marketing strategies, study the market, form a target audience and plan marketing activities taking sustainable development into account.	
Laboratory work. Cereal crops: biology, morphology and life cycle in sustainable agrosystems		11
Laboratory work. Biology and morphology of maize in the system of sustainable development of the agricultural sector		11
Laboratory work. Leguminous crops: growth biology and agronomic development factors in sustainable agrosystems		11
Independent work. Pseudocereals as a promising segment: biological features and significance for sustainable development		15
Module test. Knowledge control for module 1		30
Total for module 1		100
Module 2. Organization of Growing Industrial Crops (Raw Materials) for the Processing Industry		
Laboratory work. Morphology and botanical characteristics of tuber crops in the context of sustainable agricultural production	PLO 12, PLO 16, PLO 19. Know the features of growing industrial crops, modern technologies and marketing approaches to their sale. Be able to plan and analyse growing processes, study the market and formulate proposals for the processing sector, taking sustainable development into account.	15
Laboratory work. Root crops as an element of agrosystems: agrobiological characteristics and production significance		15
Laboratory work. Oilseed crops: agrobiological basis and production significance in sustainable agrosystems		15
Laboratory work. Family Asteraceae: morphological structure and practical significance		15
Independent work. Essential oil crops: role and development in modern agrosystems		10
Module test. Knowledge control for module 2		30
Total for module 2		100
Module 3. Sustainable Agroengineering Systems and Life Safety in Crop Production		
Laboratory work. Modern agrotechnologies: study of machinery for soil tillage, nutrition and sowing in sustainable agrosystems	PLO 12, PLO 16, PLO 19. Know modern engineering solutions for the sustainable development of	10

Topic	Learning outcomes	Assessment points
Laboratory work. Agroengineering systems: plant protection, forage harvesting and crop harvesting in sustainable agricultural production	agrosystems, labour safety and environmental protection. Be able to apply innovative technologies, plan safe technological processes and analyse their impact on sustainable development.	10
Laboratory work. Agroengineering technologies for post-harvest processing and harvesting of crops in sustainable agricultural production		10
Laboratory work. Modern agrotechnologies: study of machines for harvesting root crops, flax, vegetables and berries in sustainable agrosystems		10
Laboratory work. Assessment of the microclimate of the working environment under conditions of sustainable agribusiness development		10
Laboratory work. Primary fire extinguishing equipment: modern approaches to safety in the agricultural sector		10
Independent work. Adjustment of a machine for soil tillage, fertilizer application and sowing of agricultural crops		10
Module test. Knowledge control for module 3		30
Total for module 3		100
Module 4. Biological Potential of Farm Animals, Biosafety and Sustainable Feed Supply Systems		
Laboratory work. Digital systems of production and breeding records in animal husbandry	PLO 12, PLO 16, PLO 19. Know the biological features of animals, modern approaches to biosafety and sustainable feed supply. Be able to analyse biological potential, develop strategies for increasing productivity and safety in animal husbandry, and apply modern technologies for sustainable development.	10
Laboratory work. Innovative methods of identification, registration and marking of animals in the Smart Farming system		10
Laboratory work. Monitoring and modelling the dynamics of animal growth to assess feed conversion efficiency		10
Laboratory work. Ecological classification and determination of nutritional value and safety of feed		10
Laboratory work. Development of precision feeding rations and calculation of feed requirements		10
Independent work. Features of ontogenesis		20

Topic	Learning outcomes	Assess ment points
(individual development) of animals under conditions of technogenic load and climate change		
Module test. Knowledge control for module 4		30
Total for module 4		100
Module 5. Ecologized and Ethical Technologies for Production of Animal Husbandry Products in Closed Agrosystems		
Laboratory work. Sustainable milk production technology: digital methods of recording, assessment and quality management	PLO 12, PLO 16, PLO 19. Know modern ethical and ecological technologies in the production of animal husbandry products and their impact on sustainable development. Be able to apply ecological technologies, analyse their advantages and disadvantages, and form responsible approaches in animal husbandry.	10
Laboratory work. Technology for production of ecological beef: lifetime and post-slaughter assessment of meat quality		10
Laboratory work. Ecologized pork production technology: comprehensive assessment (bonitation) and welfare standards		10
Laboratory work. Sustainable technologies in sheep and goat breeding: accounting and ecological certification of wool and down		10
Laboratory work. Poultry farming technologies: egg-laying records and calculation of the ecological and economic efficiency of egg production		10
Laboratory work. Niche rabbit breeding and fur farming: commodity assessment of raw materials in the context of ethical standards		10
Independent work. New assessment item		20
Module test. Knowledge control for module 5		20
Total for module 5		100
Module 6. Resource-Saving Technical Support and Risk and Occupational Safety Management in Sustainable Animal Husbandry		
Laboratory work. Energy-efficient means for water supply and watering	PLO 12, PLO 16, PLO 19. Know modern resource- and energy-efficient technologies, methods of risk and occupational safety management in sustainable animal husbandry. Be able to plan and	10
Laboratory work. Resource-saving units for preparation, precise dosing and distribution of feed		10
Laboratory work. Circular systems for cleaning,		10

Topic	Learning outcomes	Assess ment points
removal and separation of manure	implement resource- and energy-saving technologies, analyse risks and ensure safe working conditions.	
Laboratory work. Automated milking installations and robotic complexes. Shearing units.		10
Laboratory work. Organization of occupational safety training and the "Vision Zero" concept (zero injuries) in agribusiness		10
Laboratory work. Risk analysis, investigation and prevention of accidents at automated animal husbandry facilities		10
Independent work. Ecological design: master plan of an eco-farm with consideration of sanitary protection zones and landscape design		20
Module test. Knowledge control for module 6		20
Total for module 6		100
Educational work (total for the semester)		70
Final examination		30
Total for the course		100

8.2. 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

8.3. Assessment policy

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

9. Teaching and learning aids

1. - electronic learning course of the academic discipline (on the NUBiP of

Ukraine eLearn learning portal -
<https://elearn.nubip.edu.ua/course/view.php?id=1477>);
- <https://elearn.nubip.edu.ua/course/view.php?id=3833>;
- Agrosystems and Sustainable Development. Part 1. Methodological recommendations for working with the course and performing practical and independent works for students of full-time, part-time and distance forms of study in specialty D5 "Marketing", educational degree "Bachelor". Honchar L.M., Tesliuk V.V., Mazurenko B.O., Onyshchenko B.V., NUBiP of Ukraine, 2026, 100 p.;

- Rebenko V.I., Potapova S.Ye. Methodological guidelines for practical classes in the discipline "Agrosystems and Sustainable Development". Part 1 (Mechanization of Animal Husbandry, Occupational Safety) for students of the first (bachelor's) level of education in specialty D5 "Marketing", educational programme "Marketing". Kyiv: NUBiP of Ukraine. 2026. 68 p.;

10. Recommended sources of information

1. Systems of Technologies in Crop Production. Methodological recommendations for performing practical and independent works for students of full-time and part-time forms of study in specialty 075 Marketing, educational degree "Bachelor". Authors: Kalenska S.M., Honchar L.M., Mazurenko B.O. 2023. 80 p.
2. Crop Production with the Fundamentals of Forage Production. S. M. Kalenska, M. Ya. Dmytryshak, T.V. Antal, V. A. Mokriienko et al. Vinnytsia: LLC "Nilan-LTD", 2023. 650 p.
3. Kalenska S.M. et al. Technologies for Growing Crops with C3 and C4 Types of Photosynthesis. Scientific and practical recommendations. Kyiv. NUBiP. 2025. 29 p.
4. Nanotechnologies in Crop Production. Collective scientific monograph edited by Academician of NAAS of Ukraine Kalenska S. M. 2025. Kyiv: Agrarian Science. 440 p. <https://doi.org/10.31073/978-966-540-667-9>
5. Scientific and practical recommendations "Technologies for Growing Castor Bean, Soybean, Sunflower, Crambe, Chufa, Winter and Spring Rapeseed. Technological Maps". Development authors: Kalenska S.M. et al. Kyiv. 2022.
6. Kalenska S.M., Rakhmetov D.B. et al. Energy and Raw-Material Plant Resources. 2023. Kyiv, NUBiP of Ukraine. 274 p.
7. Khmelnychy L.M., Povod V.V., Bordunova O.H. Technology of Production and Processing of Animal Husbandry Products: textbook. Odesa: Oldi+, 2023. 244 p.
8. Practical Course: Machines and Equipment for Animal Husbandry. Study guide / V.S. Khmelovskyi, V.V. Bratishko, V.I. Rebenko, O.O. Zabolotko, S.Ye. Potapova, O.M. Achkevych, V.I. Achkevych, M.I. Ikalchyk. Kyiv: Kondor, 2024. 280 p.
9. Voinalovych O.V. Fundamentals of Occupational Safety in Diagrams, Tables and Graphs: study guide. Kyiv: Osnova, 2022. 219 p.