NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Professor B.V. Lesik Department of Storage, Processing and Standardization of Plant Products

APPROVED
Agrobiological Faculty
" 18 " 06 2026

CURRICULUM OF ACADEMIC DISCIPLINE
"Technology of storage and processing of crop products"

Area of knowledge	**20 Agricultural sciences and food**
Specialization	**201 "Agronomy»**
Educational programme	**Agronomy**
Faculty (Institute)	**Agrobiological**
Developed by:	**Sergiy GUNKO, PhD, associate professor** (position, academic degree, academic title)

Kyiv – 2026

Description of the discipline
"Technology of storage and processing of crop products"

The discipline is studied in the final year of the Bachelor's degree program for specialists in agricultural science, after students have already learned the agronomy of growing various cereal, legume, groat, oilseed, technical, vegetable, and fruit crops. The program includes technology for post-harvest processing, storage, and primary processing of various types of cereal, groat, and legume crops for different purposes, as well as fruits, vegetables, potatoes, berries, and technical crops (such as sugar beets, flax, hops, and essential oils). The course curriculum covers the study of crop storability and its ability to produce certain processed products under favorable growing conditions and under deviations, as well as how protective factors and agrochemicals affect the quality of fresh or processed products. The basics of drying, cooling, chemical preservation, and storage of grain and other types of products are also covered. The course also examines the impact of growing and post-harvest processing factors on the storability of potatoes and vegetables, the theoretical foundations of long-term storage, and the basics of primary processing of agricultural products.

Area of knowledge, academic degree, specialty, educational programme		
Area of knowledge	*201 Agronomy*	
Academic degree	*Bachelor's*	
Specialty	*201 Agronomy*	
Educational programme	*Agronomy*	
Characteristics of the academic discipline		
Type	Compulsory	
Total number of hours	150	
Number of ECTS credits	5,0	
Number of modules	4	
Course project (work) (if any)	–	
Form of assessment	*Exam*	
Indicators of the discipline for full-time and part-time forms of university study		
	Full-time form of study	Part-time form of study
Year of study	4	
Term	7	
Lecture	*60 hr.*	*hr.*
Practical classes and seminars	*– hr.*	*hr.*
Laboratory classes	*60 hr.*	*hr.*
Self-study	*30 hr.*	*hr.*
Number of weekly classroom hours for the full-time form of study	*8 hr.*	

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

Aim: formation of specialists with knowledge of the complete process of crop production, which does not end with harvesting but requires continuation - post-harvest processing, storage, and processing technologies. In the case of seasonal production, only high-quality preservation and processing of the products ensure year-round food for humans, feed for livestock, and raw materials for the processing industry.

Prerequisites of the discipline: "Plant Physiology with Fundamentals of Biochemistry"; "Information Technology in the Field"; "Soil Science with Fundamentals of Geology"; "Plant Pathology"; "Agrochemistry"; "Agriculture"; "Crop Production"; "Vegetable Growing"; "Fruit Growing"; "Greenhouse Technologies"; "Breeding and Seed Production of Field Crops"; "Standardization and Quality Control of Plant Production"; "Economics, Entrepreneurship, and Management."

Acquisition of competencies:

Integrated competency (IC): The ability to solve complex specialized tasks and practical problems in agronomy, which involves the application of theories and methods of the relevant science and is characterized by complexity and compliance with zonal conditions.

General competencies (GC): GC 6. Knowledge and understanding of the subject area and understanding of professional practice; GC 7. Ability to apply knowledge in practical situations; GC 8. Skills for performing work safely.

Special (professional) competences (PC): PC 2. the ability to cultivate, propagate, and manage agricultural crops, and carry out technological operations for primary processing and storage of products; PC 4. the ability to apply knowledge and understanding of physiological processes of agricultural plants to solve production and technological tasks; PC 9. the ability to manage complex actions or projects, with responsibility for making decisions in specific production conditions.

Expected Learning Outcomes (ELO): ELO 4. Compare and evaluate modern scientific and technical achievements in the field of agronomy; ELO 11. Initiate operational and expedient solutions to production problems in accordance with regional conditions; ELO 15. Plan economically viable agricultural production.

2. *Programme and structure of the discipline*

Names of content modules and topics	**Number of hours**												
	Full-time form							**Part-time form**					
	weeks	total	including					total	including				
			l	p	lab	ind	self		l	p	lab	ind	self
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Module 1. ***The tasks of the crop production storage and processing industry***													
Topic 1. The significance of the storage and processing of agricultural products.	1	10	4	–	4	–	2						
Topic 2. Grain mass as an object of post-harvest processing and storage.	2	10	4	–	4	–	2						
Topic 3. Physical and physiological properties of grain masses. Self-heating of grain masses.	3	12	4	–	4	–	4						
Total for content module 1		32	12	–	12	–	8						
Module 2. ***Post-harvest handling, storage, and processing of grain (seeds)***													
Topic 1. Post-harvest processing of grain crops.	4	10	4	–	4	–	2						
Topic 2. Active ventilation of grain crops. Grain drying, regimes and methods of drying.	5	10	4	–	4	–	2						
Topic 3. General principles of preserving plant raw materials.	6	10	4	–	4	–	2						
Topic 4. Basics of grain processing for flour and bread baking.	7	10	4	–	4	–	2						
Topic 5. Basics of processing of cereal and oilseed crops.	8	10	4	–	4	–	2						
Total for content module 2		50	20	–	20		10						
Module 3. ***Post-harvest handling, storage and processing of fruit and vegetable products***													
Topic 1. Post-harvest treatment and storage of vegetable crops.	9	10	4	–	4	–	2						
Topic 2. Post-harvest treatment and storage of potato tubers.	10	10	4	–	4	–	2						
Topic 3. Specifics of post-harvest treatment and storage of fruit and berry products.	11	10	4	–	4	–	2						
Topic 4. Basics of processing fruit and vegetable products.	12	10	4	–	4	–	2						
Total for content module 3		40	12	–	12		8						
Module 4. ***Post-harvest handling, storage and processing of technical crops raw materials and feed production***													
Topic 1. Basics of post-harvest processing, storage, and processing of technical raw materials.	13	9	4	–	4	–	1						
Topic 2. Basics of technology for the production and storage of mixed feeds and plant-based feed.	14	9	4	–	4	–	1						
Topic 3. Basics of post-harvest processing, storage, and processing of sugar beet	15	10	4	–	4	–	2						
Total for content module 4		28	12	–	12	–	4						
Total hours		150	60	–	60	–	30						
Course project (work) on_____ (if included in the curriculum)	–		–	–	–	–	–						
Total hours	150		60	–	60	–	30						

3. Topics of lectures

№	Topic title	Number of hours
1	The significance of the storage and processing of agricultural products.	4
2	Grain mass as an object of post-harvest processing and storage.	4
3	Physical and physiological properties of grain masses. Self-heating of grain masses.	4
4	Post-harvest processing of grain crops.	4
5	Active ventilation of grain crops. Grain drying, regimes and methods of drying.	4
6	General principles of preserving plant raw materials.	4
7	Basics of grain processing for flour and bread baking.	4
8	Basics of processing of cereal and oilseed crops.	4
9	Post-harvest treatment and storage of vegetable crops.	4
10	Post-harvest treatment and storage of potato tubers.	4
11	Specifics of post-harvest treatment and storage of fruit and berry products.	4
12	Basics of processing fruit and vegetable products.	4
13	Basics of post-harvest processing, storage, and processing of technical raw materials.	4
14	Basics of technology for the production and storage of mixed feeds and plant-based feed.	4
15	Basics of post-harvest processing, storage, and processing of sugar beet	4
	Total	**60**

4. Topics of laboratory (practical, seminar) classes

№	Topic title	Number of hours
1	Selection of spot samples, preparation of composite and daily samples	2
2	Organoleptic (sensory) evaluation of grain	2
3	Determination of grain infestation by granary pests and damage by the corn bug	4
4	Determination of grain test weight	2
5	Determination of grain moisture content	2
6	Determination of impurities in grain (seeds)	2
7	Identification of types and subtypes of cereal crops	2
8	Determination of quantity and quality of crude gluten in	2

	wheat grain	
9	Determination of autolytic activity of grain and flour by Hagberg Falling Number	4
10	Technological calculations for grain and seed cleaning	2
11	Technological calculations for grain and seed drying	2
12	Active ventilation of grain masses.	2
13	Storage of grain (seeds)	2
14	Quantitative and qualitative accounting of grain	2
15	Calculations for grain based on its quality	2
16	Evaluation of the quality of cereals	4
17	Determination of flour quality	2
18	Evaluation of flour quality by laboratory test baking	4
19	Determination of potato quality	2
20	Storage of potatoes and vegetables in temporary (field) storage facilities	2
21	Organization of fruit and vegetable storage	4
22	Production of sauerkraut	4
23	Evaluation of the quality of sugar beets for technical purposes	2
24	Evaluation of flax fiber quality	2
	Total	**60**

5. Topics of self-study

№	Topic title	Number of hours
1	Working with standards, studying quality indicators normalization.	2
2	Microorganisms and pests of grain reserves. Their role in grain and seed storage. Preparation for laboratory classes in the workshop.	2
3	Respiration of grain masses. Preparation for laboratory classes in the workshop.	2
4	Familiarization with normalization of grain impurities. Preparation for laboratory classes in the workshop.	2
5	Technological properties of special post-harvest processing lines. Preparation for laboratory classes in the workshop.	2
6	Characteristics of storage facilities for storage of grain of different crops.	2
7	Features of drying legume and technical crops. Preparation for laboratory classes in the workshop.	2
8	Dependence of flour quality on the influence of entomo- and phytopathological factors on grain. Preparation for laboratory classes in the workshop.	2

9	Main quality indicators of oil and oilseed crops. Preparation for laboratory classes in the workshop.	2
10	Impact of cultivation factors on the quality and storability of tubers. Features of storage of carrot, beet, and other root crops. Preparation for laboratory classes in the workshop.	2
11	New and environmentally friendly schemes for processing fruit and vegetable products. Preparation for laboratory classes in the workshop.	2
12	Features of storage of different types of fruit and berry products. Preparation for laboratory classes in the workshop.	2
13	Fundamentals of post-harvest processing, storage, and processing of raw materials for rare technical crops. Preparation for laboratory classes in the workshop.	2
14	Fundamentals of post-harvest processing and storage of feed.	2
15	Fundamentals of post-harvest processing, storage, and processing of sugar beets	2
	Total	**30**

6. Methods of assessing expected learning outcomes:

- exam;
- module tests;
- essays;
- defense of practical works;
- other types.

7. Teaching methods:

problem-based learning;
- practice-oriented learning;
- project-based learning;
- research-based learning;
- educational discussions and debates;
- teamwork and brainstorming;
- verbal methods (lectures, discussions, interviews, etc.);
- practical method (practical exercises);
- visual method (method of illustrations, method of demonstrations);
- work with educational and methodological literature (note-taking, summarizing, annotating, writing a report);
- video methods (distance learning, multimedia, web-based, etc.);
- independent work (completing assignments).

8. Results assessment.

The knowledge of a higher education applicant is assessed on a 100-point scale, which is translated into a national assessment in accordance with the current "Regulations on Examinations and Tests at the NUBiP of Ukraine".

8.1 Distribution of points by types of learning activities

Educational activity	Results	Assessment
Module 1. **The tasks of the crop production preservation and processing industry**		
Lab. 1. Selection of spot samples, preparation of composite and daily samples		***7***
Lab. 2. Organoleptic (sensory) evaluation of grain		***7***
Lab. 3. Determination of grain infestation by granary pests and damage by the corn bug		***7***
Lab. 4. Determination of grain test weight		***7***
Lab. 5. Determination of grain moisture content		***7***
I.w.1 Working with standards, studying quality indicators normalization.		***12***
I.w. 2. Microorganisms and pests of grain reserves. Their role in grain and seed storage.		***12***
I.w. 3. Respiration of grain masses.		***11***
Module 1		***30***
Total for content module 1		***100***
Module 2. **Post-harvest handling, storage and processing of grain (seeds)**		
Lab. 6. Determination of impurities in grain (seeds)		***5***
Lab. 7. Identification of types and subtypes of cereal crops		***5***
Lab. 8. Determination of quantity and quality of crude gluten in wheat grain		***5***
Lab. 9. Determination of autolytic activity of grain and flour by Hagberg Falling Number		***5***
Lab. 10. Technological calculations for grain and seed cleaning		***5***
Lab. 11. Technological calculations for grain and seed drying		***5***
Lab. 12. Active ventilation of grain masses.		***5***
Lab. 13. Storage of grain (seeds)		***5***
I.w. 4. Familiarization with normalization of grain impurities.		***6***
I.w. 5. Technological properties of special post-harvest processing lines.		***6***
I.w. 6. Characteristics of storage facilities for storage of grain of different crops.		***6***
I.w. 7. Features of drying legume and technical crops.		***6***
I.w. 8. Dependence of flour quality on the influence of entomo- and phytopathological factors on grain.		***6***
Module 2		***30***
Total for content module 2		***100***
Module 3. **Post-harvest handling, storage and processing of fruit and vegetable products**		
Lab. 14. Quantitative and qualitative accounting of grain		***7***
Lab. 15. Calculations for grain based on its quality		***7***
Lab. 16. Evaluation of the quality of cereals		***7***
Lab. 17. Determination of flour quality		***7***

Lab. 18. Evaluation of flour quality by laboratory test baking		***7***
Lab. 19. Determination of potato quality		***7***
I.w. 9. Main quality indicators of oil and oilseed crops.		***7***
I.w. 10. Impact of cultivation factors on the quality and storability of tubers. Features of storage of carrot, beet, and other root crops		***7***
I.w. 11. New and environmentally friendly schemes for processing fruit and vegetable products.		***7***
I.w. 12. Features of storage of different types of fruit and berry products.		***7***
Module 3		***30***
Total for content module 3		***100***
Module 4. **Post-harvest handling, storage and processing of technical crops raw materials and feed production**		
Lab. 20. Storage of potatoes and vegetables in temporary (field) storage facilities		***7***
Lab. 21. Organization of fruit and vegetable storage		***7***
Lab. 22. Production of sauerkraut		***7***
Lab. 23. Evaluation of the quality of sugar beets for technical purposes		***7***
Lab. 24. Evaluation of flax fiber quality		***7***
I.w. 13. Fundamentals of post-harvest processing, storage, and processing of raw materials for rare technical crops.		***12***
I.w. 14. Fundamentals of post-harvest processing and storage of feed.		***12***
I.w. 15. Fundamentals of post-harvest processing, storage, and processing of sugar beets		***11***
Module 4		***30***
Total for content module 4		***100***
Coursework		***(M1 + M2)/2*0,7 ≤ 70***
Exam/Test		***30***
Total for the course		***Coursework + exam ≤ 100***
Course project/paper (if available)		***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

Deadlines and exam retaking rules	*EXAMPLE:* 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).
Academic integrity rules	*EXAMPLE:* 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	*EXAMPLE:* 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

e-learning course of the discipline (elearn.nubip.edu.ua/course/view.php?id=2742);
- lecture notes and their presentations (in electronic form);
- textbooks, teaching aids, workshops;
- methodological materials on studying the academic discipline for higher education applicants of full-time and part-time forms of obtaining higher education.

10. Recommended sources of information

1. Подпрятов Г.І., Бобер А.В., Гунько С.М. Переробка продукції рослинництва: навчальний посібник. Київ: Редакційно-видавничий відділ НУБіП України, 2023. 580 с.

2. Подпрятов Г.І., Бобер А.В. Післязбиральна доробка та зберігання продукції рослинництва: навчальний посібник. Київ: Редакційно-видавничий відділ НУБіП України, 2024. 650 с.

Information resources

1. Навчально-інформаційний портал НУБіП України : вебсайт. URL: https://elearn.nubip.edu.ua (дата звернення: 04.03.2026).

2. Національна бібліотека України імені В. І. Вернадського : вебсайт. URL: nbuv.gov.ua (дата звернення: 16.04.2026).

3. Національна бібліотека України ім. Ярослава Мудрого : вебсайт. URL: https://nlu.org.ua (дата звернення: 12.05.2026).

4. Наукова бібліотека / Національний університет біоресурсів і природокористування України : офіційний вебсайт. URL: https://nubip.edu.ua/department/naukova-biblioteka (дата звернення: 20.03.2026).

5. Методичний портал : вебсайт. URL: http://metodportal.net (дата звернення: 05.05.2026).