NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE

Department of Plant Science

Department of Agricultural Machines and System Technologies named after Academician P.M. Vasylenko

APPROVED
Faculty of Agricultural Management
"05" June 2025

CURRICULUM OF ACADEMIC DISCIPLINE

TECHNOLOGIES OF CROP PRODUCTION

Area of knowledge **D "Management, Administration and Law"**
Specialty **D3 "Management"**
Academic programme **Management**
Faculty **Agrarian management**

Developed by: **Honchar L.M.**, PhD (Agronomy),
As. Professor at the Department of Plant Science
Mazurenko B.O, PhD (Agronomy),
As. Professor at the Department of Plant Science
Onischenko B.V., Candidate of technical sciences,
As. Professor at the Department of Agricultural Machines and System Technologies named after Academician P.M. Vasylenko

Kyiv – 2025

Description of the discipline. The main goal of the discipline is to provide knowledge on creating optimal technological (agroecological) conditions for producing the required amount of high-quality plant products based on intensive photosynthesis in field crops while maintaining or increasing soil fertility. The main task is to acquire practical skills in producing high-quality, environmentally friendly products with minimal energy and labor costs while maximizing their output per unit of time and per unit of land, which requires the wide implementation of varietal, intensive, energy- and resource-saving, and ecologically appropriate technologies. Theoretical foundations of labor protection, legal foundations of labor protection for workers in crop production, safety techniques in crop production, and fire safety in crop production are covered in the course.

Area of knowledge, specialty, academic programme, academic degree		
Academic degree	*Bachelor*	
Specialty	*D3 "Management"*	
Academic programme	*Management*	
Characteristics of the discipline		
Type	Core	
Total number of hours	120	
Number of ECTS credits	4	
Number of modules	3	
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	
Term	1	
Lectures	*30 hours*	*hours*
Practical classes and seminars	*30 hours*	*hours*
Laboratory classes	*hours*	*hours*
Self-study	*60 hours*	*hours*
Number of hours per week for full-time students	*4 hours*	

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

Aim is to provide knowledge on creating optimal technological (agroecological) conditions for the production of the necessary amount of high-quality plant products based on intensive photosynthesis in field crops while maintaining or increasing soil fertility.

Competences acquired:

Integral competence (IC): the ability to solve complex specialized problems and practical problems that are characterized by complexity and uncertainty of conditions, in the field of management or in the process training involving the application of theories and methods social and behavioral sciences.

General competence (GC):_

GC 4. Ability to apply knowledge in practical situations

Special (professional) competence (SC):

- SC 1 Ability to identify and describe organizational characteristics

• SC 2 The ability to analyze the results of the organization's activities, to compare them with the factors of influence of the external and internal environment
• SC 6 Ability to act socially responsibly and consciously.
• SC 10 The ability to evaluate the work performed, to provide their quality and motivate the organization's personnel
• SC 12 Ability to analyze and structure problems organizations, form informed decisions.

Expected learning outcomes (ELO):

ELO 4 Demonstrate skills in identifying problems and substantiating managerial solutions
ELO 5. Describe the content of the functional areas of an organization's activities.
ELO 6 Demonstrate the skills of searching, collecting and analyzing information, calculating indicators to justify management decisions
ELO 12 Evaluate the legal, social, and economic consequences of an organization's functioning.

2. Programme and structure of the discipline

Modules and topics	**Number of hours**												
	full-time							**part-time**					
	weeks	total	including					total	including				
			l	p	lab	ind.	s.st.		l	p	lab	ind.	s.st.
Module 1. ***Management of the production process of cultivation technologies of cereals***													
Topic 1. The development of plant science and agriculture as a production industry. The current state of plant production in Ukraine and worldwide.		6	2		2		2	5	1				4
Topic 2. Cereals is a basis of crop production		8	2		2		4	7	1				6
Topic 3. Organizational principles of effective winter wheat cultivation.		8	2		2		4	10	2				8
Topic 4. Early and late spring cereals – organizational principles of effective cultivation		8	2		2		4	8					8
Topic 5. Legumes. Management in cultivation technologies of peas and soybean		8	2		2		4	8					8
Total for module 1	**38**		**10**		**10**		**18**	38	4				34
Module 2. ***Organization of cultivation of industrial crops (raw materials) for processing industry.***													
Topic 6. Tuber crops. general characteristics features at management of production		8	2	-	2	-	4						
Topic 7. Root crops. Sugar beets is a main raw material for sugar production		8	2	-	2	-	4						
Topic 8. The place of oil crops in Ukraine and the world. Choosing a crop and management in its		8	2	-	2	-	4						

cultivation													
Topic 9. Sunflower and rapeseed - the main oil crops of Ukraine and the world		10	2	-	2	-	6						
Total for module 2	**34**		**8**		**8**		**18**						
Module 3. ***Mechanization in crop production. Theoretical basis of Labor protection***													
Topic 10. General issues of the discipline. Tractors and cars. Machines for tillage, fertilization and planting of crops.		8	2		2		4						
Topic 11. Machines for plant protection, green harvesting and harvesting of cereal crops		8	2		2		4						
Topic 12. Machines for post-harvest processing of cereals, harvesting corn and potatoes		6	2		2		2						
Topic 13. Machines for harvesting root crops of beets, flax, vegetables and fruit and berry crops.		9	2		2		5						
Topic 14. Organization of Labor Protection in Crop Production		9	2		2		5						
Topic 15. Labor Protection when Working with Mechanisms													
Total for module 3	**48**		**12**		**12**		**24**						
Course project (work) _____ **(if included in the curriculum)**													
Total hours	**150**		**30**		**30**		**60**						

3. **Topics of lectures**

No.	Topic	Hours
1	Development of Crop Production as a Science and Agricultural Sector. Current State of Crop Production in Ukraine and Worldwide.	2
2	Cereal Crops – The Basis of Grain Production in Agriculture.	2
3	Organizational Principles for Effective Winter Wheat Cultivation.	2
4	Early and Late Spring Cereal Crops – Organizational Aspects in Their Cultivation Technologies.	2
5	Legumes. Management in the Cultivation Technologies of Pea and Soybean.	2
6	Tuber Crops. General Characteristics and Management Features of Their Cultivation.	2
7	Root Crops. Sugar Beet as the Main Raw Material for Sugar Production in Ukraine.	2
8	The Role of Oilseed Crops in Ukraine and Worldwide. Crop Selection and Cultivation Management.	2
9	Sunflower and Rapeseed – Major Oilseed Crops in Ukraine and the World.	2
10	Tractors and Automobiles. Machinery for Soil Tillage, Fertilizer Application,	2

	and Crop Sowing.	
11	Machinery for Plant Protection, Green Mass Harvesting, and Cereal Crop Harvesting.	2
12	Machinery for Post-Harvest Grain Processing, Corn and Potato Harvesting.	2
13	Machinery for Harvesting Root Crops such as Sugar Beet, Flax, Vegetables, and Fruit and Berry Crops.	2
14	Organization of Occupational Safety in Crop Production.	2
15	Occupational Safety When Working with Machinery.	2

4. **Topic of laboratory (practical, seminars) classes**

No.	Topic	Hours
1	General characteristics of cereal crops.	2
2	Characteristics of crops and their growth phases	2
3	Botanical and morphological characteristics of wheat.	2
4	Morphological structure of corn.	2
5	Legume crops. Features of growth and development.	2
6	Potatoes. Botanical characteristics.	2
7	General characteristics of root vegetables.	2
8	Characteristics of representatives of the oil crop group.	2
9	Sunflower. Morphological structure.	2
10	Ensuring Working Conditions in Enclosed Spaces	2
11	General issues of the discipline. Tractors and cars. Machines for tillage, fertilization and planting of crops.	2
12	Machines for plant protection, green harvesting and harvesting of cereal crops	2
13	Machines for post-harvest processing of cereals, harvesting corn and potatoes	2
14	Machines for harvesting root crops of beets, flax, vegetables and fruit and berry crops	2
15	Ensuring Safe Working Conditions in the Field	2

5. **Topics of self-study**

No.	Topic	Hours
1	Spring barley: biological features, cultivation technology.	6
2	Buckwheat: significance, biological features, cultivation technology.	6
3	Lentils: significance, biological features, cultivation technology.	4
4	Chickpeas: significance, biological features, cultivation technology.	4
5	Oil crops of the Brassicaceae family.	6
6	Essential oil crops.	5
7	Fiber crops.	5
8	Setting up a machine for tillage, fertilizing and planting of crops.	14
9	Labor protection documentation	10

6. Methods of assessing expected learning outcomes:

– oral or written survey;
– interview;
– test;

7. **Teaching methods *(select necessary or add):***

– problem-based method;
– practice oriented studying method;
– case method;
– research based method;
– learning discussions and debates method;

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

Educational activity	Results	Assessment
Module 1. **Management of the production process of cultivation technologies of cereals**		
Practical work 1. General characteristics of cereal crops.	To know the morphological structure, biological characteristics, and main uses of cereal grain crops.	**11**
Practical work 2. Characteristics of crops and their growth phases	To understand the key differences in the inflorescence and grain structures within this group of crops; to identify the features of growth, development, and phenological stages of cereal grasses.	**11**
Practical work 3. Botanical and morphological characteristics of wheat.	To know the morphological structure and types of wheat, its biological characteristics, and its main uses.	**11**
Practical work 4. Morphological structure of corn.	To know the morphological structure, biological characteristics, and uses of maize (corn).	**11**
Practical work 5. Legume crops. Features of growth and development.	To be able to describe the differences among legume species in terms of plant habit and seed traits. To become familiar with the most common forms of pea and soybean.	**11**
Self-study 1.	To demonstrate the ability to plan seed procurement for sowing in accordance with the planned crop area structure.	**15**
Module control work 1.		**30**
Total for module 1		**100**
Module 2. **Organization of cultivation of industrial crops (raw materials) for processing industry.**		
Practical work 6. Potatoes. Botanical characteristics.	To know the biological characteristics of tuber crops; the structure and specific features of potato vegetation	**15**
Practical work 7. General characteristics of root vegetables.	To know the biological characteristics of root crops; the structure and vegetative features of root crops in the first and second years of growth.	**15**
Practical work 8. Characteristics of representatives of the oil crop group.	To describe the criteria for classifying oilseed crops by degree of desiccation, quality	**15**

	indicators of oil, and morphological characteristics of oilseed plants from different botanical families.	
Practical work 9. Sunflower. Morphological structure.	To know the structural and morphological features of sunflower, including subspecies of sunflower achenes.	**15**
Self-study 2.	To demonstrate skills in planning the harvesting period and estimating post-harvest seed processing costs.	**10**
Module control work 2.		**30**
Total for module 2		**100**
Module 3. **Mechanization in crop production. Theoretical basis of Labor protection**		
Practical work 10. General issues of the discipline. Tractors and cars. Machines for tillage, fertilization and planting of crops.	To demonstrate practical skills in working with laboratory equipment related to tractors, automobiles, and agricultural machinery.	**10**
Practical work 11. Machines for plant protection, green harvesting and harvesting of cereal crops	To know the machines used for plant protection, fodder harvesting, and legume crop harvesting.	**10**
Practical work 12. Machines for post-harvest processing of cereals, harvesting corn and potatoes	To know the machines used for post-harvest grain processing, maize grain harvesting, and potato harvesting.	**10**
Practical work 13. Machines for harvesting root crops of beets, flax, vegetables and fruit and berry crops	To know the machines used for harvesting root crops such as sugar beet, flax, vegetables, and fruit and berry crops.	**10**
Practical work 14. Ensuring Working Conditions in Enclosed Spaces	To describe various aspects of the microclimate in the workplace.	**10**
Practical work 15. Ensuring Safe Working Conditions in the Field	To assess the consequences of using primary fire extinguishing equipment and how to act in case of fire.	**10**
Self-study 2.	To be able to prepare the Astra SZ-3.6A grain seeder for operation.	**10**
Module control work 2.		**30**
Total for module 2		**100**
Class work		**(M1 + M2 + M3)/3*0,7 ≤ 70**
Exam/credit		**30**
Total for year		**(Class work + exam) ≤ 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	Assignments submitted after the deadline without valid reasons will be graded lower. Resitting of modules will be allowed with the permission from the lecturer and in the presence of valid reasons (e.g. medical reasons).
Academic integrity rules	Cheating during tests and exams is strictly prohibited (including the use of mobile devices). Coursework and research papers must contain correct citations for all sources used.
Attendance rules	Class attendance is mandatory. In case of objective reasons (such as illness or international internships), individual learning may be allowed (in online format by the approval of the dean of the faculty).

9. Teaching and learning aids:

- e-learning course of the discipline https://elearn.nubip.edu.ua/course/view.php?id=459 ;
- references to digital educational resources:

- Crop production manual. FAO. 2020. Available at: https://www.fao.org/3/ca7556en/CA7556EN.pdf
- Statistics in Agriculture. Available at: https://fao.org/faostat
- Ministry of Agriculture Politics http://www.minagro.kiev.ua/
- Technology of cultivation (field crops) http://agro-business.com.ua/
- Technology of cultivation (field crops) https://www.agronom.com.ua/

- textbooks, manuals, tutorials;
- guidelines for studying a discipline by full-time and part-time students;
- internship programmes of the discipline (if included in the curriculum).

10. Recommended sources of information

- CROP PRODUCTION GUIDE AGRICULTURE. Tamil Nadu Agricultural University. Link: https://www.freebookcentre.net/biology-books-download/gotoweb.php?id=13855
- Graham Thiele, Michael Friedmann, Hugo Campos, Vivian Polar, Jeffery W. Bentle. Root, Tuber and Banana Food System Innovations. Springer, 2022. DOI: https://doi.org/10.1007/978-3-030-92022-7
- Kalenska S., Dmytrishak M., Antal T., Mazurenko B., Crop production with basis of fodder production, Kyiv, 2021. [In Ukrainian]
- Petrichenko V.F., Lykhochvor V.V. Roslynnytstvo. Novi tekhnolohii vyrashchuvannia polevykh kultur: pidruchnyk. - 5-te vid., vyrav., dopov. Lviv: NVF "Ukrainski tekhnolohii", 2020. 806 p. (Title: Crop Production. New Technologies for Field Crop Cultivation: Textbook)