

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

Department of Plant Science

APPROVED
Faculty of Plant Protection, Biotechnology and Ecology
“05” June 2025

**CURRICULUM OF ACADEMIC DISCIPLINE
PLANT SCIENCE AND THE BASICS OF FODDER
PRODUCTION**

Area of knowledge _____

Specialty **202 Plant Protection and Quarantine**

Academic programme **Plant Protection and Quarantine**

Faculty **Faculty of Plant Protection, Biotechnology and Ecology**

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Description of the discipline Plant science and the basics of fodder production

Purpose of the course is to provide the theoretical knowledge and practical skills of the production of plant products, skills in the rational choice and effective use of various elements of technology in order to increase the productivity of culture and reduce the cost of production.

Objectives is to develop the students' knowledge and skills in the based on the study of plant biological characteristics, students will be able to further develop measures and methods for optimizing environmental factors to maximize the potential of agricultural crop productivity. The discipline is based on the knowledge about the plants of field culture, the peculiarities of their development, the requirements for environmental factors, modern techniques and technologies for the cultivation of high yields of high quality at the lowest cost of labor and funds. In turn, crop production is the basis for such sciences as economics and organization of agricultural production.

Area of knowledge, specialty, academic programme, academic degree		
Academic degree	<i>Bachelor's</i>	
Specialty	202 "Protection and Plant Quarantine	
Academic programme	Plant Protection and Quarantine	
Characteristics of the discipline		
Type	Core	
Total number of hours	120	
Number of ECTS credits	4	
Number of modules	4	
Course project (work) (if any)		
Form of assessment	<i>exam</i>	
Indicators of the discipline for full-time and part-time forms of university study		
	University study	
	Full-time	Part-time
Year of study	3	
Term	5	
Lectures	30 <i>hours</i>	<i>hours</i>
Practical classes and seminars	30 <i>hours</i>	<i>hours</i>
Laboratory classes	- <i>hours</i>	<i>hours</i>
Self-study	60 <i>hours</i>	<i>hours</i>
Number of hours per week for full-time students	- <i>hours</i>	

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

to provide the theoretical knowledge and practical skills of the production of plant products, skills in the rational choice and effective use of various elements of technology in order to increase the productivity of culture and reduce the cost of production

Competences acquired:

Integral competence (IC):_ Ability to solve complex specialized tasks and practical problems in the field of plant protection and quarantine, and to apply theoretical knowledge and methods of phytosanitary monitoring, inspection, analysis, and expertise, which are characterized by complexity and uncertainty of conditions.

General competence (GC):

GC 2. The ability to apply knowledge in practical situations.

GC 3. Knowledge and understanding of the subject area and understanding of professional activities.

GC 6. Skills in using information and communication technologies for professional activities.

Special (professional) competence (SC):

SC 8. The ability to comprehensively apply methods for long-term regulation, development, and spread of harmful organisms to economically non-detectable levels based on forecasting, economic thresholds of harm, effectiveness of beneficial organisms, energy-efficient and environmentally friendly technologies, ensuring reliable plant protection and environmental safety in accordance with the WTO SPS Agreement and the provisions of EU legislation.

Expected learning outcomes (ELO):

ELO 6. Correctly utilize appropriate methods of observation, description, identification, classification, cultivation of agrobiocenoses, and maintaining their stability to preserve natural biodiversity.

ELO 7. Create technological maps for organizing plant protection measures.

ELO 8. Be able to coordinate, integrate, and improve the organization of production processes during plant protection measures

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. <i>Cereals and legumes</i>														
Topic 1. Cultivation technologies and crop classification		8	2	2			4							
Topic 2. Winter crops. Cultivation of winter wheat		8	2	2			4							
Topic 3. Spring crops. Cultivation technology of corn		8	2	2			4							
Topic 4. Legumes. Cultivation technology of peas and soyabeans		8	2	2			4							
Total for module 1		32	8	8			16							
Module 2. <i>Industrial crops</i>														
Topic 5. Root and tuber crops. Potato and beets		8	2	2			4							
Topic 6. Oil crops. Sunflower and rapeseeds		8	2	2			4							
Topic 7. Fiber crops. Hemp, flax and cotton		8	2	2			4							
Topic 8. Special and niche crops		8	2	2			4							
Total for module 2		32	8	8			16							
Module 3. <i>Fodder crops</i>														
Topic 9. Types of feed and their assessment		8	2	2			4							
Topic 10. Field fodder productions		8	2	2			4							
Topic 11. Meadow fodder productions		8	2	2			4							
Topic 12. Harvesting and utilization of conserved		8	2	2			4							

feeds													
Total for module 3	32	8	8			16							
Module 4. Agrometeorology													
Topic 13. Air and light conditions		8	2	2			4						
Topic 14. Impact of precipitations		8	2	2			4						
Topic 15. Agrometeorology complex influence on agrocenosis		8	2	2			4						
Total for module 3	24	6	6			12							
Total hours	120	30	30			60							
Course project (work) _____ (if included in the curriculum)													
Total hours	120	30	30			60							

3. Topics of lectures

No.	Topic	Hours
1	Plant science as branch of agriculture. Condition of modern plant science in Ukraine and world.	2
2	Technology of crop production	2
3	Wheat and corn a basis crops of Ukrainian agriculture.	2
4	Legumes: value, biological characteristics, growth technology	2
5	Tuber and taproot crops. Features of sugarbeet cultivation	2
6	Oil crops. Cultivation technology of winter rapeseed plant	2
7	Fiber crop. Cultivation of oil and fiber flax	2
8	Cultivation technology of medicinal plants, tabaco and hop.	2
9	Types off feeds, Role of fodder production in animal rations	2
10	Field fodder productions. Main crops	2
11	Meadow fodder production. Annual and perennial grasses	2
12	Harvesting and utilization of conserved feeds	2
13	Main Agrometeorological Factors	2
14	Climate and Its Importance for Agriculture.	2
15	Agrometeorological Forecasts	2
Total hours		30

4. Topic of laboratory (practical, seminars) classes

No.	Topic	Hours
1	General characteristics of agriculture crops. Classification of crops by families. Botanical classification of crops. Structure of plants.	2
2	True cereals (Gramineae). Species and varieties of wheat, triticale, rye. Features of growing and uses these crops.	2
3	Millet-like cereals (Gramineae). Biological characteristics of Zea and sorghum . Species and subspecies of Zea and sorghum. Biological features of millet and rice. Biological features of buckwheat. Structure of buckwheat plant.	2
4	Common characteristics of Legumes.	2
5	General characteristics of industrial and tuber crops. Potato, differentiation on group of varieties.	
6	Oil plants and essential oil. Sunflower and his classifications. Castor oil plant. Oil crops from Brassicaceae, Asteraceae and Legumes. Oil crop from other families	2

7	Fiber crops. Hemp, flax, cotton.	2
8	Medicinal and aromatic crops	2
9	Classification of Feeds. Comparative Assessment of Different Feed Groups	2
10	Cereal and Leguminous Grain Crops: Importance, Nutritional Value, Use in the Fodder Production System, and Preparation for Feeding	2
11	Silage, Unconventional Fodder Crops, and Intermediate Crops	2
12	Characteristics of Major Hayfield and Pasture Crops	2
13	Measurement of Solar Radiation Intensity. Calculation of Direct, Diffuse, Total, and Photosynthetically Active Radiation	2
14	Measurement of Air Temperature. Structure and Analysis of the Annual Temperature Cycle Graph	2
15	Calculation of Agroclimatic Indicators of the Region	2
Total hours		30

5. Topics of self-study

No.	Topic	Hours
1	The Role of Crop Science in Modern Conditions: Ukraine and the World	8
2	Legumes and Industrial Crops: Biological Characteristics and Cultivation Technologies	8
3	Cereal Crops: Diversity of Species and Cultivation Aspects	8
4	Forage Production: Role, Types of Feeds, and Harvesting	10
5	Industrial and Specialized Crops: From Potatoes to Medicinal Plants	8
6	Detailed Characterization and Preparation of Feeds	6
7	Agrometeorological Factors and Their Impact on Agriculture	12
Total hours		60

6. Methods of assessing expected learning outcomes:

- oral or written survey;
- test;
- defending laboratory/practical, design/graphical works, projects;
- peer-to-peer assessment, self-assessment.

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. <i>Cereals and legumes</i>		
Practical work 1.	ELO 6, 7, 8 This course enables students to proficiently observe and cultivate agrobiocenoses, fostering stability and biodiversity through a deep	10
Practical work 2.		10
Practical work 3.		10
Practical work 4.		10

Self-study 1.	understanding of plant science, modern crop production technologies for key crops like wheat, corn, and legumes. Graduates will acquire the essential skills to create comprehensive technological maps for effective plant protection and to coordinate production processes, ensuring integrated and improved agricultural practices.	15
Self-study 2.		15
Module control work 1.		30
Total for module 1		100
Module 2. <i>Industrial crops</i>		
Practical work 5.	ELO 6, 7, 8 This module deepens students' ability to cultivate and manage diverse agrobiocenoses, including tuber, taproot, oil, fiber, and specialized crops like sugarbeet, rapeseed, flax, medicinal plants, tobacco, and hop. Students will develop advanced skills in creating precise technological maps for plant protection and efficiently coordinating production processes to maintain biodiversity and sustainable agricultural practices.	10
Practical work 6.		10
Practical work 7.		10
Practical work 8.		10
Self-study 3.		15
Self-study 4.		15
Module control work 2.		30
Total for module 2		100
Module 3. <i>Fodder crops</i>		
Practical work 9.	ELO 6, 7, 8 This module advances students' capabilities in observing and managing diverse agrobiocenoses by focusing on feed classification, nutritional value, and cultivation of various fodder crops, including cereals, legumes, silage, unconventional, and hayfield plants. Students will refine their skills in developing technological maps for plant protection and optimizing production processes, ensuring stable and biodiverse agricultural systems for sustainable feed production.	10
Practical work 10.		10
Practical work 11.		10
Practical work 12.		10
Self-study 5.		15
Self-study 6.		15
Module control work 3.		30
Total for module 3		100
Module 4. <i>Agrometeorology</i>		
Practical work 13.	ELO 6, 7, 8 This module equips students with critical skills in agrometeorological analysis, including measuring solar radiation, air temperature, and calculating agroclimatic indicators. This knowledge enhances their ability to observe and cultivate stable agrobiocenoses, predict and mitigate risks, create precise technological maps for plant protection, and optimize agricultural production processes based on comprehensive climate understanding and agrometeorological forecasts.	20
Practical work 14.		20
Practical work 15.		20
Self-study 7.		10
Module control work 4.		30
Total for module 4		100
Class work	$(M1 + M2+M3+M4)/4 * 0,7 \leq 70$	
Exam/credit	30	
Total for year	$(\text{Class work} + \text{exam}) \leq 100$	

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	<ul style="list-style-type: none">• <i>Tasks must be submitted on time, according to the delivery schedule.</i>• <i>Penalty for delay:</i><ul style="list-style-type: none">- 10% – less 1 month- 20% – more 1 month• <i>Re-assessment will be allowed if you pass all tasks in module</i>
Academic integrity rules	<i>Plagiarism and re-delivery tasks don't allow</i>
Attendance rules	<i>Attendance is mandatory. For objective reasons (for example, illness, international internship) training can take place individually (in online form in consultation with the dean of the faculty)</i>

9. Teaching and learning aids:

- e-learning course of the discipline (<https://elearn.nubip.edu.ua>) MANDATORY;
- CROP PRODUCTION GUIDE AGRICULTURE. Tamil Nadu Agricultural University. Link: <https://www.freebookcentre.net/biology-books-download/gotoweb.php?id=13855>

Petrichenko V.F., Lykhochvor V.V. Roslynyntstvo. 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)

10. Recommended sources of information

1. 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>
2. Kalenska S., Dmytrishak M., Antal T., Mazurenko B., Crop production with basis of fodder production, Kyiv, 2021. [In Ukrainian]
3. Crop production manual. FAO. 2020. Available at: <https://www.fao.org/3/ca7556en/CA7556EN.pdf>
4. Statistics in Agriculture. Available at: <https://fao.org/faostat>
5. Ministry of Agriculture Politics <http://www.minagro.kiev.ua/>
6. Technology of cultivation (field crops) <http://agro-business.com.ua/>
7. Technology of cultivation (field crops) <https://www.agronom.com.ua/>