Ministry of Education and Science of Ukraine
Sumy National Agrarian University
Faculty of Agrotechnology and Environmental Management
Department of Breeding and Seed Production named after Prof. M. D. Goncharov

Work program (syllabus) of the educational component

EC 11 Systems of innovative technologies in agricultural production

(mandatory)

Specialty	073 Management
Educational program	Educational and professional program "Management"
Level of higher education	First (bachelor's) level

SUMY – 2024

Developer: Butenko A., Candidate of Agricultural Sciences, Associate Professor of the Department of Breeding and Seed Production named after Prof. M. D. Goncharov

Considered, approved and ratified at the meeting of the Department of Agricultural Technologies and Soil Science	Protocol from 02.06.2025 p. № 18
	Head of the department

Approved by:

Guarantor of the educational program — (signature) — Natalia STOYANETS (last name, first name)

Dean of the Faculty — (signature) — Marharyta LYSHENKO (last name, first name)

Syllabus review (attached) is provided by: — (signature) — Victoriya TKACHENKO (last name, first name)

Representative of the Department of Education Quality Assurance, Licensing and Accreditation — (signature) — Nadiya BARANIK (last name, first name)

Registered in electronic data base: 06.08.2024 (date)

1. MODULE OVERVIEW

1.	Title	Systems of innovative technologies in agricultural production		
2.	Faculty/Department	Faculty of Agrotechnology and Environmental Management Department of Breeding and Seed Production named after Prof. M. D. Goncharov		
3.	Type (compulsory or optional)	compulsory		
4.	Program(s) to which module is attached (*to be filled in for compulsory types*)	«Management» Academic Program, area of specialization 073 «Management»		
5.	Module can be suggested for (*to be filled in for optional types*)			
6.	Semester and duration of module	1 semester (1-15 weeks), 2 semester, 1-15 weeks		
7.	ECTS credits number	5 credits (150 hours)		
8.	Total workload and time allotment	Directed study		Self-directed study
		Lectures	Practicals	
		30	30	90
9.	Language of instruction	English		
10.	Module leader	Butenko A., Candidate of Agricultural Sciences, Associate Professor of the Department of Breeding and Seed Production named after Prof. M. D. Goncharov		
11.1	Module leader contact information	andb201727@ukr.net Department of Breeding and Seed Production 04t Consultation time every Monday 13:00		
11.	Module description	The subject of study of the academic discipline is: formation of a system of knowledge about agricultural production in future specialists, study of the basics of agronomy and cultivation of agricultural crops and production of products using intensive technologies..		
12.	Module aim	Students' acquisition of special theoretical knowledge about the basics of agronomy, crop production and animal husbandry for their use in the process of accounting, control and analysis of production activities		
13.	Module Dependencies (prerequisites, co-requisites, incompatible modules)	1. The educational component is based on "Agricultural Systems", "Programming of Crop Yields." 2. The educational component is the basis for the formation of a system of knowledge in future specialists regarding agricultural production, studying the basics of agronomy and growing crops and producing products using intensive technologies, which will be useful when analyzing economic indicators of agricultural activities, enterprises, in particular when studying the discipline "Production Economics of Agricultural Enterprises.		
14.	The policy of academic integrity	Compliance with academic integrity for higher education applicants involves: independent performance of educational tasks, tasks of current and final control of learning outcomes; reference to sources of information when using ideas, statements, information; compliance with the norms of copyright legislation; provision of reliable information about the results of one's own educational or scientific activities. Violations of academic integrity when studying the OK "Systems of innovative technologies in agricultural production" are		

		considered: academic plagiarism, academic fraud (copying, deception, passing off someone else's work as one's own), use of electronic devices during the final control of knowledge For violation of academic integrity, education applicants may be held liable for the following academic liability: Academic plagiarism - score 0, re-performance of the task. Academic fraud - cancellation of points received; re-passing the assessment; re-performance of work not completed independently; Use of electronic devices during the final control of knowledge - suspension from work, score 0, re-passing the final control
15.	Link in Moodle	https://cdn.snau.edu.ua/moodle/enrol/index.php?id=3624

2. CORRELATION BETWEEN MODULE LEARNING OUTCOMES (MLOs) AND PROGRAM LEARNING OUTCOMES (PLOs)

MLOs: **On successful completion of the module the student will be able to:**	Program learning outcomes that the EC aims to achieve (indicate the number according to the numbering given in the EP)		How assessed
	PLO 5	PLO 19	
MLO 1. Demonstrate knowledge and understanding of theoretical provisions; concepts of the agro-industrial complex of Ukraine. Ways to increase agricultural productivity		+	Multiple choice test and individual assignment. Presentation, report. Written exam. Control test (multiple choice questions; midterm certification). Cooperation of applicants in a group and the ability to work focused. Careful checking and analysis of completed tasks. Defense of practical work. Discussion of selected ways to solve the problem. Mastering skills and abilities during observation. Observation of applicants in the process of completing tasks
MLO 1. Demonstrate the acquired knowledge and practical skills in the development and improvement of innovative technology systems in agricultural production and characterize the technologies for the production of agricultural products.	+	+	Multiple choice test and individual assignment. Presentation, report. Written exam. Control test (multiple choice questions; midterm certification). Cooperation of applicants in a group and the ability to work focused. Careful checking and analysis of completed tasks. Defense of practical work. Discussion of selected ways to solve the problem. Mastering skills and abilities during observation. Observation of applicants in the process of completing tasks
MLO 1. Understand the most important technological foundations of production, procurement, storage and processing of crop products	+	+	Multiple choice test and individual assignment. Presentation, report. Written exam. Control test (multiple choice questions; midterm certification). Cooperation of applicants in a group and the ability to work focused. Careful checking and analysis of completed tasks. Defense of practical work. Discussion of selected ways to solve the problem. Mastering skills and abilities during

			observation. Observation of applicants in the process of completing tasks
MLO 1. To possess the principles of rational use of technological processes for the production of milk and meat of farm animals, poultry farming and beekeeping	+	+	Multiple choice test and individual assignment. Presentation, report. Written exam. Control test (multiple choice questions; midterm certification). Cooperation of applicants in a group and the ability to work focused. Careful checking and analysis of completed tasks. Defense of practical work. Discussion of selected ways to solve the problem. Mastering skills and abilities during observation. Observation of applicants in the process of completing tasks

PLO 5. Describe the content of the functional areas of the organization..
PLO 19. Use modern information technologies in the management of resources and databases to substantiate management decisions regarding the choice of innovative technologies in agricultural enterprises

3. MODULE INDICATIVE CONTENT

Topic. List of issues to be considered within the topic	Distribution of hours			Learning resources
	Classroom work		Selfdirected study	
	Lectures	Practicals		
Topic 1. Current state and prospects of crop production. Efficiency of crop production in Ukraine and regions. Agricultural management systems in Ukraine. Crop production as a science, the contribution of Ukrainian scientists. Current state and prospects for the development of the agricultural complex.	2	2	5	1,3,5,8,
Topic 2. Soil science and land reclamation. Soil science as a science of the origin and development of soil. The study of soil as the main means of agricultural production. The priority of domestic scientists in the creation and development of soil science.	2	2	5	1,5,6,9,
Topic 3. Farming systems. Crop rotations. Agriculture as a science that develops methods for the most rational use of arable land and increasing soil fertility. Farming system. The concept of the farming system as a scientific basis for farming.	2	2	5	7,8,10,
Topic 4. Fundamentals of agrochemistry. Chemicalization as a means of agricultural production. Agrochemistry as a science of plant nutrition, the use of fertilizers to obtain high yields of agricultural crops.	2	2	5	2,5,6,8,

Topic 5. Soil cultivation systems. Integrated protection system. Land as a means of agricultural production. Land use efficiency. Conditions for increasing land use productivity. Soil cultivation. Tasks of mechanical soil cultivation.	2	2	5	8,9,
Topic 6. Breeding and seed production. Varieties and varietal control of agricultural crops. Seeds and seed control. Producers of seeds and planting material in Ukraine and in the Sumy region. Organization of seed production in Ukraine. Standardization, problems of accounting and determining product quality, the basis for its objective assessment.	2	2	5	6,9,
Topic 7. Programming of agricultural crop yields. Programming as a scientifically based program for obtaining a given level of yield in specific soil and climatic conditions, taking into account intensification factors: variety, seeds, , plant protection, cultivation technology.	2	2	5	7,9,
Topic 8. Technology of growing grain crops. Winter wheat, winter rye - national economic importance. Specific weight in the grain balance of Ukraine.	2	2	5	1,3,4,5,
Topic 9. Technologies of growing oilseed and fiber crops. Oilseed crops. Importance of oilseed crops. Growing areas, yield, gross harvest of oilseed crops. Sunflower - botanical and biological features.	2	2	5	1,3,8,
Topic 10. Technologies of growing leguminous, sugar-bearing and starchy crops. Grain legumes. The role of legumes in increasing grain production and solving the problem of vegetable protein. Biological fixation of nitrogen from the air.	2	2	5	1,3,4,9,
Topic 11. Technology of growing fodder crops. Field and meadow fodder production. Forage grasses. The role of perennial and annual grasses in creating a strong fodder base as the main condition for the development and increase in livestock productivity.	2	2	5	4,6,9,
Topic 12. System of technologies for processing crop products. Procurement, storage, processing of grain and food stocks and technical raw materials. Characteristics of quality indicators when procuring batches of grain, seeds and products of individual crops for their intended purpose (food, feed and technical).	2	2	5	1,2,6,8,9,
Topic 13. Current state of livestock production. Principles of production planning. Volumes and rates of development of production of various types of products in Ukraine, regions, in particular in Sumy region.	2	2	10	1,2,7,8,
Topic 14. Technology of milk and meat production of farm animals. Technology of milk production on an industrial basis, flow-shop production system. Systems and methods of keeping cattle. Methods and modes of milking, cooling and pasteurization of milk.	2	2	10	5,6,7,9,

Topic 15. Technology of production of poultry and beekeeping products. Technology of egg production. Egg laying of different types and breeds of farm poultry. Features of keeping and feeding laying hens. Methods of collecting eggs. Features of technology of poultry meat production..	2	2	10	1,2,3,4,5,
Total	30	30	90	

4. TEACHING AND LEARNING METHODS

MLOs	Teaching methods (directed study)	Hours	Learning methods (self-directed study)	Hours
MLO 1. Demonstrate knowledge and understanding of theoretical provisions; concepts of the agro-industrial complex of Ukraine. Ways to increase agricultural productivity	-verbal (teaching lecture, conversation, story, explanation, educational discussion); - visual (demonstration, illustration, presentation); - practical (exercise, experiment, practical work); - by the logic of presentation (induction, deduction); - by the level of cognitive activity (explanatory-illustrative, reproductive, problem presentation, partially-search, research); - interactive teaching methods (interactive technologies of collective-group and cooperative learning: general circle, microphone, unfinished ideas, brainstorming, case method, work in small groups, dialogue, synthesis of thoughts, joint project, information search, circle of ideas); - non-traditional teaching methods (teacher as moderator, game design).	32	reading literature on the topic, watching videos on the Internet and on the Moodle platform Performing and submitting laboratory work	22
MLO 1. Demonstrate the acquired knowledge and practical skills in the development and improvement of innovative technology systems in agricultural production and characterize the technologies for the production of agricultural products.		20	independent search for educational information, performing laboratory work of partial search content, complex didactic tasks and tasks.	26
MLO 1. Understand the most important technological foundations of production, procurement, storage and processing of crop products		10	working with textbooks, manuals, Internet materials; , illustration, demonstration, performing experiments, exercises, tasks, independent work, etc.	10
MLO 1. To possess the principles of rational use of technological processes for the production of milk and meat of farm animals, poultry farming and beekeeping		14	reading literature on the topic, watching videos on the Internet and on the Moodle platform Performing and submitting laboratory work	16

5. ASSESSMENT

5.1. Diagnostic assessment

5.2. Summative assessment

5.2.1. Intended learning outcomes methods:

№	Summative assessment methods	Grades	Deadline

1	Module 1 – multiple choice test	40 points /25 %	According to the approved schedule
2	Module 2 – multiple choice test	30points /25 %	According to the approved schedule
4	Presentation preparation	15 points /15 %	According to the approved schedule
6	Multiple choice test	15 points /15 %	At 15 weeks

5.1.1. Grading criteria

Summative assessment method	**Unsatisfactory**	**Satisfactory**	**Good**	**Excellent**
Multiple choice test	*<20 points*	*20-25 points*	*25-30 points*	*31-40 points*
	Less than 60% of correct answers	60% - 74% of correct answers	75% - 89% correct answers	90-100% correct answers
Multiple choice test	*<10 points*	*10-14 points*	*15-20 points*	*21-30 points*
	Less than 60% of correct answers	60% - 74% of correct answers	75% - 89% correct answers	90-100% correct answers
Presentation preparation	*<9 points*	*9 – 10 points*	*11- 13 points*	*14 – 15 points*
	Task requirements not met	Present research results in different ways	Present research results in an appropriate format	Present research results in a way that is most appropriate in certain circumstances, using different forms of information presentation
Multiple choice test	*<9 points*	*9 – 10 points*	*11- 13 points*	*14 – 15 points*
	Less than 60% of correct answers	60% - 74% of correct answers	75% - 89% correct answers	90-100% correct answers

Formative assessment

Formative exercises are designed to enable students to develop particular aspects of their learning, prior to summative assessments. Formative exercises are designed to help students use feedback and self-reflection to manage and develop their learning so that they can see how to improve their work.

№	**Formative Assessment elements**	**Date**
1	Testing in Google Forms, Kahoot, Quizizz	At each practical lesson (introductory control)
2	Oral feedback from the teacher and students on the implementation of individual calculation and analytical tasks	For 3 weeks
3	Oral feedback from the teacher and students on the performance of an individual task on the main types of empirical social research	For 9 weeks
4	Oral feedback from the teacher and students on the implementation of the individual task of choosing sociometric criteria	For 11 weeks
5	Oral feedback from the teacher and students on the project implementation (preparation, presentation, defense)	For 14 weeks

5.1 The evaluation scale is generally accepted for the University

Evaluation scale: national and ECTS

The sum of points for all types of educational activities	Evaluation on a national scale *(when counting)*
90 - 100	counted
82-89	
75-81	
69-74	
60-68	
35-59	not credited with the possibility of repeating drafting
0-34	not enrolled with mandatory repeated study of the discipline

6 LEARNING RESOURCES

6.1 Base

1. Amjid Ali. Mastering Information Technology: A Practical Guide for Beginners, Professionals & Business Leaders. Kindle Unlimited. 2025. 338 p.

2. Efraim Turban, Carol Pollard, Gregory Wood. Information Technology for Management: Driving Digital Transformation to Increase Local and Global Performance, Growth and Sustainability. Wiley; 12th Edition. 2021. 640 p.

3. Mark John Lado. Introduction to Information Technology and Beyond AI: How Can You Master Information Technology Modern Best Practices? Kindle Edition. 2025. 86 p.

6.2 Additional resources

1 Benjamin Zeldovich. Excel 2022: Dominate Microsoft Excel & Master the 101 Most Popular Formulas from Scratch. Become a Pro in 5 Minutes a Day with Practical and Step-by-Step Tutorials. Kindle Edition, 2022. 142 p.

2 Carol V. Brown, Daniel W. DeHayes, Jeffrey Slater, Wainright E. Martin. Managing Information Technology. Pearson; 7th Edition. 744 p. URL: https://www.academia.edu/43658549/Managing_Information_Technology_7th_Edition_by_Carol_V_Brown_Daniel_W_DeHayes_Jeffrey_Slater_Wainright_E_Martin.

3 Geoff Williams, Michael May. The Facility Manager's Guide to Information Technology: Learning Series - Module 1 Kindle Edition, 2021. 64 p.

4 James Holler. Microsoft Office 365 for Beginners 2022: [8 in 1] The Most Updated All-in-One Guide from Beginner to Advanced | Including Excel, Word, PowerPoint, OneNote, OneDrive, Outlook, Teams and Access Kindle Edition, 2022. 587 p.

5 Jeremy L. Boerger. Rethinking Information Technology Asset Management. Business Expert Press, 2021. 150 p.

6 Kiet Huynh. Introduction to Enterprise Resource Planning (ERP) Systems: Streamlining Operations, Enhancing Efficiency, and Driving Growth. Kindle Edition. 2024. 103 p.

7 Litmux Books. Information Systems: How Application Of Big Data Drives Industries. The Real Work of Information Systems. Kindle Edition. Litmux.com, 2021. 85 p.

8 Makarova V.V., Mohylna L.M., Tkachenko A.V. Innovatsiini napriamy rozvytku zbutovoi zovnishnoekonomichnoi diialnosti lisohospodarskykh pidpryiemstv zavdiaky informatsiinym ta tsyfrovym tekhnolohiiam. Modern economics. Vyp. 39. 2023. DOI: https://doi.org/10.31521/modecon.V39(2023)-16 (accessed 12 July 2025).

9 Mike Wang. EXCEL 2022: The All In One Step-by-Step Guide From Beginner To Expert. Discover Easy Excel Tips & Tricks to Master the Essential Functions, Formulas & Shortcuts to Save Time & Simplify Your Job. Independently published, 2022. 158 p