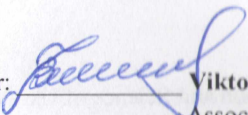
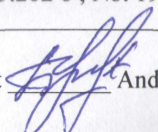


Ministry of Education and Science of Ukraine
Sumy National Agrarian University
Faculty of Agricultural Technologies and Environmental Management
Department of Breeding and Seed Production named after Prof. M. D. Goncharov

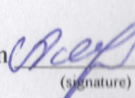
Work program (syllabus) of the educational component
SELECTION AND SEED RESEARCH METHODS IN AGRONOMY
(name)
(required)

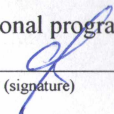
Specialty	H1 Agronomy
Educational and scientific program	Agronomy
Level of higher education	Third (educational and scientific)
Qualification	Doctor of Philosophy (PHD) in Agronomy

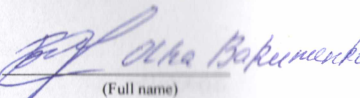
Developer:  Viktor ONYCHKO, Candidate of Sciences,
Associate Professor, Associate Professor
Department of Breeding and Seed Production
named after Prof. M. D. Goncharova

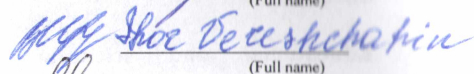
Considered, approved and ratified at a meeting of the Department of Breeding and Seed Production named after Prof. M. D. Goncharov	Minutes of 18.05.2026, No. 19
	Head of the Department <u></u> Andriy BUTENKO (signature) (surname, initials)

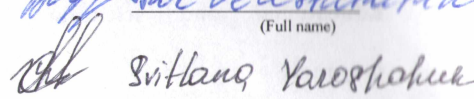
Agreed:

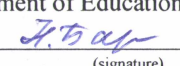
Guarantor of the educational and scientific program  (Andriy MELNYK)
(signature) (full name)

Dean of the faculty where the educational program is implemented
 (Sergiy GORBAS)
(signature) (full name)

Review of the work program (attached) provided by: 
(Full name)


(Full name)

Head of PhD office 
(Full name)

Methodologist of the Department of Educational Quality,
licensing and accreditation  (V. Baranov)
(signature) (full name)

Registered in the electronic database: date: 22.06 2026.

Information on reviewing the work program (syllabus):

Academic year in which changes are made	Number of the appendix to the work program with a description of the changes	Changes reviewed and approved		
		Date and number of the minutes of the department meeting	Head of the Department	Educational program guarantor

1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

1.	Name OK	Breeding and seed research methods in agronomy									
2.	Faculty/departm ent	Faculty of Agriculture and Forestry, Department of Breeding and Seed Production named after Prof. M.D. Goncharov									
3.	Status OK	Mandatory									
4.	Program/Specialty(s) that include OK for	ONP "Agronomy" of the third educational and scientific level of higher education in the specialty H1 "Agronomy"									
5.	OK can be offered for										
6.	NQF level	8									
7.	Semester and duration of study	3rd semester, weeks 1-10									
8.	Number of ECTS credits	3 ECTS credits									
9.	Total hours and their distribution	Contact work (classes)								Independent work	
		Lectures		Practical / seminar		Laboratory					
		Day	Correspondence.	Day	Correspondence.	Day	Correspondence.	Day	Correspondence.		
		90	20		20				50		
10	Type of control	Exam									
11.	Language of instruction	Ukrainian									
12.	Teacher/Educational Component Coordinator	V. Onychko, PhD, associate professor									
12.1	Contact information	Onichko Viktor Ivanovych, Associate Professor of the Department of Breeding and Seed Production named after Prof. M.D. Goncharov, room 2 of the greenhouse complex. <i>e-mail</i> : onichko@gmail.com . <i>Phone</i> : (099)9062263 <i>Consultation hours</i> are every Wednesday from 2:00 PM to 3:00 PM,									
13.	General description of the educational component	The discipline is based on the tasks and principles defined by the laws of Ukraine "On Seeds and Planting Material" (https://zakon.rada.gov.ua/rada/show/411-15#Text ; "On the Protection of Rights to Plant Varieties" (https://zakon.rada.gov.ua/rada/show/3116-12#Text) and approaches that involve a combination of theoretical training and practical skills. Given the great importance of the agricultural sector for the economy of Ukraine, the stabilization of the socio-economic situation, and the growth of the export potential of food and feed grain, when studying this discipline, the main attention will be paid to the study of methods for creating high-yielding varieties and hybrids, the organization and methodology of variety testing; the organization of seed production of field crops; the introduction of the latest technologies for seed production, its processing, and service of seed market entities.									
14.	Purpose of the educational component	Training of postgraduate students who have knowledge about the essence of the breeding process, breeding methods and their use to create high-yielding varieties and hybrids, organization and methodology of variety									

		testing, organization and technology of seed production of field crops.
15.	Prerequisites for studying OK, connection with other educational components of OP	1. The educational component is based on the program outcomes of master's studies analyze and interpret knowledge from general and special vocational training in context 2. The educational component is the basis for the formation of the dissertation.
16.	Academic Integrity Policy	The integrity policy should determine the independence of execution, deadlines and procedure for submitting papers, prevention of plagiarism and copying, correct citation, honest use of AI, and liability for violations. Compliance with academic integrity defined by the "Regulations on the Organization of the Educational Process at SNAU (https://drive.google.com/file/d/1THXbcZySe0C6UwlnG3Uy_V64uRngnbz_k/view) and the "Code of Academic Ethics of SNAU (https://drive.google.com/file/d/1aTo1TmzZSEnW9NyaCF98_HgSCcrhAR_n/view) provides for: independent completion of educational tasks, tasks of current and final control of learning results; 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 (scientific, creative) activities.
17.	Keywords	Breeding, seed production, variety, hybrid, adaptive potential, yield, productivity, sowing qualities, varietal response, seed productivity, seed material
18.	Link to the course in Moodle	https://cdn.snaueu.ua/moodle/course/view.php?ID=5895

2. LEARNING OUTCOMES BY EDUCATIONAL COMPONENT AND THEIR RELATIONSHIP WITH PROGRAM LEARNING OUTCOMES

Learning outcomes for OK: After studying the educational component, the student is expected to be able to...	Program learning outcomes that the OC aims to achieve (indicate the number according to the numbering given in the OP)				How is RND assessed?
	PH1	PH3	PH5	PH7	
DRN 1. Know the features of the historical development of breeding and seed production, the formation of breeding as a science. Have knowledge of the directions and tasks of breeding and seed production of the main field crops in the conditions of different soil and climatic zones of Ukraine. Be able to use source material in breeding and know the methods of its creation. Know the classification of varieties by origin and methods of creation, production requirements for the variety.	X		X	X	Multiple choice tests
DRN 2. Possess knowledge of the use of modern breeding methods in creating varieties and hybrids of field crops : intraspecific and distant hybridization, polyploidy, aneuploidy, haploidy, experimental mutagenesis, heterosis.		X	X		Multiple choice tests, individual assignment
DRN 3. Understand analytical methods of selection and organization of the selection process. Principles of organization of the selection process, schemes of selection work with self-pollinated, cross-pollinated and vegetatively propagated crops.	X	X			Multiple choice tests
DRN 4. Organization of industrial seed production of field crops, planning and implementing technological processes for growing high-quality seed material of varieties and hybrids, understanding the methodology of conducting soil and laboratory varietal control.			X	X	Multiple choice tests, individual assignment

PH1. Plan and carry out theoretical and experimental research in agronomy and related scientific areas using modern methods, technologies and tools, critically analyze the results of one's own research and the results of other researchers in the context of the entire complex of modern knowledge regarding the problem under study.

PH5. Freely present and discuss research results, scientific and applied problems of agronomy with specialists and non-specialists in the state and foreign languages, competently reflect research results in scientific publications in leading international scientific publications.

PH7. Deeply understand the general principles and methods of agricultural sciences, as well as the methodology of scientific research, and apply them in their own research in the field of agronomy and teaching practice.

3. CONTENT OF THE EDUCATIONAL COMPONENT (COURSE PROGRAM)

Topic. List of issues to be addressed within the topic	Distribution within the total time budget (full-time/part-time)				Recommended reading
	Classroom work			Independent work	
	Luke	P.z/semz	Lab.z.		
Topic 1. The emergence and development of selection . Historical development of selection. Development and achievements of selection in Ukraine. Directions and tasks of selection of main field crops in different soil and climatic zones of Ukraine. Selection centers. Current state and achievements of selection in foreign countries.	2	2	-	4	1, 3, 4, 6, 7, 10, 11
Topic 2. Methods of forming source material for plant breeding. The role of source material in plant breeding. Introductions in breeding . Classification of varieties by origin and methods of creation. Variety as an element of intensive crop growing technology. Requirements for the variety.	2	2	-	6	1, 3, 4, 5, 6, 7, 10, 11
Topic 3. Hybridization as the main method of plant breeding Hybridization as the main method of creating source material in modern breeding. Selection of parental pairs during crossing. Types of crossings. Methodology and technique of crossings. Difficulties of crossing different species and genera. Inheritance of traits and properties during distant hybridization. Methods of overcoming non-crossing.	2	2	-	6	1, 3, 4, 5, 6, 7, 10, 11
Topic 4. Using experimental mutagenesis methods in plant breeding Mutational variability and its significance for breeding. Different types of mutations, their manifestation and significance as source material in the breeding process. Methods of working with mutant populations. Methods of obtaining polyploid forms. Haploidy, its significance in breeding. Aneuploidy, its significance, use in plant breeding.	2	2	-	6	1, 3, 4, 5, 6, 7, 10, 11
Topic 5. Application of heterosis and genetic engineering methods in plant breeding The concept of heterosis. Types of heterosis. The importance of heterosis in breeding and its use. The use of inbreeding in breeding for heterosis. Methods for obtaining self-pollinating lines. Breeding for combining ability. Genetic engineering in plant breeding.	2	2	-	4	1, 3, 4, 5, 6, 7, 10, 11
Topic 6. Analytical methods of selection. Selection as the main method of selection.	2	2	-	4	1, 3, 4, 5, 6, 7, 10, 11

Classification of selection methods. The essence of the concepts of morphological and economically valuable traits, their stability and significance for selection. Selection by individual traits and their complex. Mass and individual, single, multiple (continuous), family-group and individual-family selection.					
Topic 7. Organization and technique of the breeding process Principles of organization of the breeding process. Scheme of the breeding process. Breeding crops and their purpose. Scheme of breeding work with self-pollinated and cross-pollinated crops. Breeding of vegetatively propagated crops. Organization and conduct of state variety testing.	2	2	-	6	1, 3, 4, 5, 6, 7, 10, 11
Topic 8. Theoretical foundations of seed production The concept of varietal and sowing qualities and seed productivity. Reasons for the deterioration of varietal qualities of seeds during reproduction. Measures to maintain the purity of the variety, improve the health of seeds and planting material. Ecological foundations of seed production.	2	2	-	4	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Topic 9. Organization of seed production. Method of microclonal plant propagation. Principles of organization of industrial seed production. Concept of insurance and transitional seed funds. Technology of production of high-quality seeds. Post-harvest processing of seeds. Experience of organization of industrial seed production in foreign countries. Application of microclonal propagation methods in breeding.	2	2	-	4	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Topic 10. Peculiarities of seed production of individual crops Seed production of self-pollinated crops. Peculiarities of seed production of cross-pollinated plants. Production of hybrid seeds of different types of hybrids. Methodology for conducting soil and laboratory varietal control, their purpose and objectives. Method of monitoring compliance with seed storage parameters.	2	2	-	6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Total	20	20		50	

4. TEACHING AND LEARNING METHODS

DRN	Teaching methods (work that will be carried out by the teacher <u>during classroom lessons</u> , consultations)	Number of hours	Teaching methods (what types of learning activities should the student <u>perform independently</u> .)	Number of hours
DRN 1. Know the features of the historical development of breeding and seed production, the formation of breeding as a science. Have knowledge of the directions and tasks of breeding and seed production of major field crops in different soil and climatic zones of Ukraine. Be able to use source material in breeding and know the methods of its creation. Know the classification of varieties by origin and methods of creation, production requirements for the variety.	Educational lecture (narration, explanation, demonstration), Practical lesson (explanation, demonstration)	8	Working with lecture notes, working with regulatory acts, generalization, systematization, deepening of the material	10
DRN 2. Possess knowledge of the use of modern breeding methods in creating varieties and hybrids of field crops: intraspecific and distant hybridization, polyploidy, aneuploidy, haploidy, experimental mutagenesis, heterosis.	Educational lecture (narration, explanation, demonstration), Practical lesson (explanation, demonstration)	12	Working with lecture notes, generalization, systematization, deepening of the material	16
DRN 3. Understand analytical methods of selection and organization of the selection process. Principles of organization of the selection process, schemes of selection work with self-pollinated, cross-pollinated and vegetatively propagated crops.	Educational lecture (narration, explanation, demonstration), Practical lesson (explanation, demonstration)	8	Working with lecture notes, generalization, systematization, deepening of the material	10
DRN 4. Organize the management of industrial seed production of field crops, plan and implement technological processes for growing high-quality seed material of varieties and hybrids, understand the methodology for conducting soil and laboratory varietal control.	Educational lecture (narration, explanation, demonstration), Practical lesson (explanation, demonstration)	12	Working with lecture notes, generalization, systematization, deepening of the material	14
Total		40		50

5. EVALUATION BY EDUCATIONAL COMPONENT

5.1. Summative assessment

5.1.1 The following is provided for assessing the expected learning outcomes:

No.	Summative assessment methods	Points / Weight in the overall score	Date of compilation
1.	Testing 1 (multiple choice, open-ended tests)	25/25%	4 week
2.	Testing 2 (multiple choice, open-ended tests)	25/25%	Week 8
3.	INDS	20/20%	10 week
4.	Exam	30/30%	12 week

5.1.2 Evaluation criteria

Component	Unsatisfactorily	Satisfactorily	Good	Perfectly
Testing 1	<15 points	15-17 points	18-21 points	22-25 points
	less than 60% of the tasks were answered correctly	provided the correct answer to 60% -74% of the tasks	provided the correct answer to 75% -89% of the tasks	provided the correct answer to 90% or more of the tasks
Testing 2	<15 points	15-17 points	18-21 points	22-25 points
	less than 60% of the tasks were answered correctly	provided the correct answer to 60% -74% of the tasks	provided the correct answer to 75% -89% of the tasks	provided the correct answer to 90% or more of the tasks
INDS	<12 points	13-14 points	16 points	18-20 points
	Task requirements not met	Most requirements are met, but some components are missing or not sufficiently disclosed	All task requirements met	All task requirements were met, the results were presented as part of the general discussion

5. 2. Formative assessment

5.2.1 To assess current progress in learning and understand areas for further improvement, the following is provided:

No.	Elements of formative assessment	Date
1.	Passing modular control testing with feedback from the teacher	According to the educational process schedule
2.	Verbal feedback from the teacher during classes	during classes
3.	Oral feedback from the instructor and students after presentations	Week 5
4.	Consultations, verbal feedback from the teacher while working on the INDS	during classes
5.	Oral feedback between the teacher and the graduate student on the results of the INDS	8-10 weeks

Self-assessment can be used as an element of summative assessment or formative assessment.

5.3 Total score for OK and rating scale

The total number of points for the educational component is 100 points.

5.3.1 Grading scale in force at the University:

Total points for all types of learning activities	National scale assessment	
	For exam, course project (work), practice, qualification work	for credit
90 – 100	perfectly	enrolled
82-89	good	
75-81		
69-74		
60-68	satisfactorily	
35-59	unsatisfactory with the possibility of reassembly	not accepted with the possibility of retaking
0-34	unsatisfactory with mandatory re-study of the discipline	not passed with mandatory re-study of the discipline

6. LEARNING RESOURCES (LITERATURE)

6.1. Main sources

6.1.1. Textbooks manual

1. Vasylykivskiy S. P., Kochmarskyi V. S. Selection and seed production of field crops: textbook. PrJSC "Mironivska printing house", 2016. 376 p.
2. Agronomy : a textbook for the third (educational and scientific) level of higher education in the specialty H1 "Agronomy" / A.V. Melnyk, Y.I. Danko, Y.G. Mishchenko and others; edited by A.V. Melnyk, Y.I. Danko. Odessa: Oldi+, 2025. 550 p.
3. Onichko V. I., Stavytsky A. A., Onichko T. O. Selection and seed production of field crops: a textbook . Sumy: SNAU, 2026. 260 p.

6.1.2 Methodological support

4. Onichko V. I. Electronic course on the discipline "Selection and seed research methods in agronomy" in the MOODLE environment. <https://cdn.snau.edu.ua/moodle/course/view.php?id=5895>.
5. Breeding and seed research methods in agronomy: *methodological guidelines for practical classes* / ed.: V. I. Onychko. Sumy, 2025. - 36 p.
6. Breeding and seed research methods in agronomy: *methodological guidelines for independent work* / ed.: V.I. Onichko. - Sumy, 2025. – 62 p.

6.1.3. Other sources

7. Molotskyi M. Ya., Vasylykivskiy S. P., Knyazyuk V. I. Selection and seed production of field crops: practical work. 2nd ed., revised and supplemented. Bila Tserkva: Bila Tserkva National Agrarian University, 2008. 192 p.
8. Sokolov V. M. , Vyshnevsky V. V., Kindruk M. O., etc. Methodology for inspecting seed crops of grain crops. Odessa-Kyiv, 2010. 35 p.
9. Special selection and seed production of field crops: teaching manual / ed. V.V. Kyrychenko. - Kh.: IR named after V.Ya. Yuryev NAAS of Ukraine, 2010. - 462p.
10. Chekalin M. M., Tyshchenko V. M., Batashova M. E. Selection and genetics of individual crops: a textbook. Poltava: FOP Govorov S. V., 2008. 368 p.
11. Singh D. P., Singh A. K., Singh A. Plant Breeding and Cultivar Development. Elsevier Science & Technology, 2021. 662 p.

6.2. Additional sources

12. State Register of Plant Varieties Suitable for Distribution in Ukraine [Electronic resource]. – Access mode: . <http://sops.gov.ua/derzavnij-reestr> .
13. Seed and seedling production in Ukraine [Electronic resource]. – Access mode: <http://www.naukr.org.ua> .
14. Kovalenko I., Vereshchahin I., Butenko Ye., Kandyba N., Onychko V., Bakumenko O., Kovalenko V., Klochkova T. (2022) Rapid-Analysis of Flax Varieties of the Ukrainian National Collection *Ecological Engineering and Environmental Technology*, 23 (3), pp.1-6. <https://doi.org/10.12912/27197050/146384>.
15. Kovalenko V., Dolia M., Tonkha O., Butenko A., Onychko V., Masyk I., Onychko T., Radchenko M., Kokovikhin S. (2023) Adaptation potential of alfalfa among other crops with resource-saving technologies while preserving ecological biodiversity. *Modern phytomorphology* . V. 17. pp. 57-65.
16. Pankova O. V., Syrovytskyi K. G., Kharchenko S. O., Onychko V. I., Tyrelnyk B. V., Dumanchuk M. Yu. Preparation of corn seed material by electromagnetic radiation in different modes as a method of increasing yield. *Bulletin of the Sumy National Agrarian University. Series "Mechanization and Automation of Production Processes"* . 2022. 48 (2). P. 50-55. <https://doi.org/10.32845/msnau.2022.2.7> .
17. Butenko A., Sobko M., Onychko V., Turchina S., Dashutina L., Tymchuk N., Volokhova O., Vechirka V., Shpetnyi V. (2025) Evaluation of the Effectiveness of Leanum Biofertilizer in the Management of Organic Crop Rotation and Buckwheat Productivity. *Rocznik Protection Environment* , V. 27, pp . 305–311. <https://doi.org/10.54740/ros.2025.024> .
18. Pidluzhny E.G., Onichko V.I., Chernobay L.M., Pylypenko V.S., Shevchenko O.L. Comparative agroecological characteristics of new varieties of winter wheat in terms of productivity and resistance to biotic factors. *Tavria Scientific Bulletin* . Series: Agricultural Sciences. 2026, Issue 148. Part 3. P. 57-66. DOI <https://doi.org/10.32782/2226-0099.2026.148.3.7>

6.3 Software

19. Moodle 3.11 distance learning system software – for organizing distance learning for students (access to educational materials, communication with the teacher, implementation of various types of assessments).
20. Zoom Video Communications, Inc. v. 5.6.1 software – for organizing training via video communication.