

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY NATIONAL AGRARIAN UNIVERSITY

"APPROVED"

by Academic Council of Sumy NAU

« 10 » 25.03 2019

(Minutes No.)

Chairman of the Academic Council

Rector Academician of NAAS of Ukraine

V.I. Ladyka

Educational - scientific program implemented

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Rector Academician of NAAS of Ukraine

V.I. Ladyka

(Order No. _____ " _____ " _____ 20____)



EDUCATIONAL - SCIENTIFIC PROGRAM

«ECOLOGY»

third (educational and scientific) level of higher

education by the specialty 101 «Ecology»

Field of study 10 «Natural Sciences»

Qualification: Philosophy Doctor Degree (PhD)





Sumy 2019

LIST OF AGREEMENT

Educational - Scientific Program in Specialty

«Ecology»

Level of higher education – third (educational and scientific)

The project team consists of:		
The Chairman of the project team (guarantor of the program):		
Doctor of biological science, professor, Head of the Ecology and Botany Department	 (Підпис)	Skliar Victoria Hryhorivna
Members of the project group:		
Doctor of biological science, professor, Dean of the Faculty of Agrotechnologies and Natural Resource Management	 (Підпис)	Kovalenko Ihor Mykolaiovych
Candidate of biological science, assistant professor, assistant professor of the Ecology and Botany Department	 (Підпис)	Klymenko Hanna Olexandrivna
Candidate of biological science, assistant professor, assistant professor of the Ecology and Botany Department	 (Підпис)	Kyrylchiuk Kateryna Serhiivna

PREFACE

The Educational - Scientific Program (ESP) for the training of applicants for higher education (adjuncts) of the third educational and scientific level in the specialty 101 “Ecology” contains the amount of ECTS credits required to obtain the appropriate degree of higher education: list of competencies; normative content of adjuncts training, formulated in terms of learning outcomes; forms of certification of applicants for the third level of higher education; requirements for the availability of a system of internal quality assurance of higher education.

ESP training of specialists of the third educational and scientific level of higher education is developed in accordance with the Law of Ukraine “On Higher Education” of July 1, 2014, Resolutions of the Cabinet of Ministers of Ukraine “On Higher Education” of November 23, 2011 “On approval of the national qualifications framework” December 30, 2015 № 1187, “On approval of licensing conditions for educational activities of educational institutions” of December 20, 2015 and taking into account the draft standard of higher education of Ukraine for the third level of higher education (Doctor of Philosophy) developed by the scientific-methodical subcommittee

1. Profile of educational - scientific program in specialty 101 “Ecology”

1– General information	
Full name of higher education institution and structural subdivision	Sumy National agrarian University
Level of higher education	third (educational-scientific) level
Higher education degree	Doctor of Philosophy (Philosophy Doctor degree)
Field of study	10 – Natural Sciences
Specialty	101 – Ecology
Official name of the educational - professional program	«Ecology»
Educational qualification	Doctor of Philosophy in the field of natural sciences
Professional qualification	-
Qualification in the Diploma	Level of higher education – doctor of Philosophy (PhD) Specialty – 101 “Ecology” Educational program “Ecology”
Type of the diploma and scope of the educational program	Unitary, 57ECTS credits, (educational component ESP), program length -4 years
Restrictions as for forms of studying	absent
Accreditation availability	Not accredited
Cycle / level	NQF of Ukraine – 8 level, FQ-EHEA – third cycle, EQF LLL – 8 level
Prerequisites	Presence of the second (master's) level entrants in higher education, (educational-qualification level of specialist). The requirements to the entrants are determined by the Rules of admission to the educational and scientific program PhD (Doctor of Philosophy)
Language of studying	Ukrainian, English
Length of the educational program	until 2023 (initiated in 2019)
Internet address of the permanent placement of the description educational program	https://science.snau.edu.ua/aspirantura/

2 – The purpose of educational –scientific program

The purpose of the educational - scientific program is to form students' ability to dynamically combine knowledge, skills, communication skills and abilities while solving complex problems in the field of professional and / or research and innovation activities in the specialty 101 “Ecology”, which involves deep rethinking holistic knowledge and / or professional practice in the implementation of continuous self-development and self-improvement

3 – Characteristics of educational –scientific program

Subject area (field of study, specialty, Specialty(in the presence))	Field of study - 10 – Natural Sciences Specialty 101 – “Ecology”
Orientation of the educational - scientific program	Educational -scientific ESP has a scientific orientation. The program is aimed at developing students' research and teaching competencies, communication skills. Educational-scientific program contains educational and scientific components.

	<p><i>Educational component</i> - 57 ECTS credits, of which 42 ECTS credits – obligatory subjects, 15 ECTS credits – disciplines by applicant's choice.</p> <p><i>Scientific component</i> provides for the implementation of their own research under the guidance of supervisor / supervisors with the design of the results in the form of a dissertation. This component of the program is not measured by ECTS credits, but is drawn up separately in the form of an individual plan of scientific work of the applicant.</p>
Object of studying	Structure and functional components of ecosystems of different levels and origins; anthropogenic impact on the environment and optimization of nature management.
Purposes of studying	To deepen theoretical knowledge and practical skills in the field of Natural Sciences in "Ecology", to develop philosophical and linguistic competencies, to acquire the ability to produce new ideas, to solve complex problems in the field of ecology and to conduct their own research.
The main focus of the educational program	<p>Special, infield 10 «Natural Science», specialty – 101 "Ecology"</p> <p><i>Key words:</i> ecology, environmental protection, complex population analysis, anthropogenic impact, monitoring, balanced nature management, nature protection measures, greening of the agrosphere</p>
Theoretical content of the subject area	Concepts, concepts, principles of modern ecology and their use for environmental protection, sustainable use of nature and sustainable development.
Peculiarities of the program	The program is aimed at training applicants for higher education of the third educational and scientific level in the specialty 101 "Ecology", who can conduct research based on the latest advances in knowledge 10 "Natural Sciences" on the basis of Sumy National Agrarian University, as well as leading scientific and environmental institutions of Ukraine and the world. ESP provides professional training in combination with general. The latter involves the development of students' skills of teamwork, academic writing, teaching competencies. In this case, professional training is implemented mainly in the selective component of the SNP, and general - mainly in the mandatory component of the program. Professional training is aimed at the formation of conceptual and methodological knowledge and skills in "Ecology", with priority given to studying the features and patterns of phytodiversity at the population level of living matter, as well as the development and implementation of comprehensive population analysis of environmental measures and environmental management .
Methods, methodology and techniques	Methods of collecting, processing and interpreting the results of ecological research, methods of computer modeling, physical, chemical and biological methods of studying the structure and properties of ecological systems.
4 – Graduates' eligibility to employment and further education	

Employment eligibility	<p>Graduates have ample opportunities for career development depending on their personal interests, in particular: scientific, teaching, expert, managerial, administrative activities in the field of "Natural Sciences" in the specialty 101 "Ecology". The level of training allows you to develop a professional career based on strategic thinking and deep knowledge in the field of Natural Sciences.</p> <p>The specialist is able to perform the specified professional work (according to the "Classifier of professions DK 003: 2010"):</p> <p>1221 heads of production units in agriculture, forestry and water management, fish farming, fishing and nature reserve;</p> <p>1237 heads of research subdivisions and subdivisions for scientific and technical preparation of production and other heads;</p> <p>2213 professionals in agronomy, water management, zooengineering, forestry, land reclamation and nature reserve;</p> <p>2310 teachers of universities and higher educational institutions; and other areas of activity in the specialty.</p>
Further studying	<p>Studying for development and self-improvement in scientific and professional spheres of activity in the specialty 101 "Ecology", as well as other related fields of scientific knowledge: training at the 10th (scientific) level of the NRC of Ukraine in the field 10 "Natural Sciences"; educational programs, research grants and scholarships (including abroad) that contain additional educational components. Various forms of lifelong learning (both in Ukraine and abroad) to improve skills and improve management and administrative, scientific, research, teaching or other activities.</p>
5 – Teaching and assessment	
Approaches to teaching and studying	<p>Approaches to teaching and studying:</p> <ul style="list-style-type: none"> - active learning (interactive learning methods that provide a person-centered approach and the development of systematic, creative and strategic thinking; joint training in interdisciplinary groups, "inverted class"; - learning by teaching (pedagogical practice); - training through research (including participation in the implementation of budgetary and economic contract research work, participation in research projects); <p>Personalized Learning: individual consultations with supervisors; elective professional disciplines).</p>
System of assessment	<p>Educational component of the program. The system of evaluation of the obtained learning outcomes in the disciplines of the educational-scientific program consists of current and final control.</p> <p><i>Current control</i> of knowledge is carried out in oral form (survey on the results of the processed material).</p> <p><i>Final control</i> of knowledge - in the form of written and oral exams, tests.</p>

	<p>During the current and final control in the process of assessment of disciplines that provide professional training, the applicant's prepared and published scientific articles are taken into account in collections that are included in professional publications and / or publications that are included in international scientometric databases.</p> <p><i>Scientific component</i> of the program. Evaluation of the scientific activity of applicants is carried out in accordance with the scientific plan of the graduate student through:</p> <ul style="list-style-type: none"> - participation in seminars of the department, conferences; - review of scientific works; - self-assessment; - recommendations of the supervisor; - intermediate attestations of the graduate student in the form of the annual report on performance of the individual plan; <p>preparation and presentation of the dissertation</p>
<p>Form of control success of applicant</p>	<p><i>Educational component of the program.</i></p> <p>The final assessment of the educational components of the control of the applicant's learning success is carried out in the form of:</p> <ul style="list-style-type: none"> - exam - based on the results of studying the mandatory components of the educational program of the cycle of general scientific training, the cycle of research training, the cycle of language training, as well as the cycle of special (professional) training; credit - based on the results of studying all other educational components provided by the curriculum <p><i>Scientific component of the program.</i></p> <p>The scientific component of ONP provides for the current certification of graduate students at a meeting of the department twice a year. The purpose of the intermediate attestation is to assess the level of implementation of the individual plan, provide support and feedback to the applicant.</p> <p>The purpose of the final certification is to establish compliance with the level of educational and scientific training of graduate students to the requirements of the educational and scientific program of Doctor of Philosophy in the specialty 101 "Ecology" and ends with the public defense of the dissertation. The defense of the dissertation takes place in public at a meeting of the specialized academic council.</p> <p>Mandatory prerequisite for admission to the defense of the dissertation, subject to successful implementation of the individual scientific plan, is the approbation of research results and main conclusions at scientific conferences and their publication in professional scientific journals, in accordance with current requirements.</p>
<p>6 – Competencies of the program</p>	

Integral competencies	Ability to solve complex problems in the field of ecology, environmental protection and sustainable use of nature in the implementation of research and innovation activities, which involves a deep rethinking of existing and creation of new holistic knowledge, mastering the methodology of scientific and scientific-pedagogical activities, conducting independent research have scientific novelty, theoretical and practical significance.
General competencies (GC)	C01. Ability to abstract thinking, analysis and synthesis. C02. Ability to communicate in the state language both orally and in writing. C03. Ability to communicate in a foreign language. C04. Ability to conduct research at the appropriate level. C05. Ability to search, process and analyze information from various sources. C06. Ability to identify, pose and solve problems. C07. Ability to work in an international context. C08. Ability to work autonomously. C09. Ability to develop and manage projects
Special (professional) competencies (PC)	C010. Ability to master concepts, theoretical and practical problems, history of development and current state of scientific knowledge in the field of ecology, environmental protection and optimization of nature. C11. Ability to form a systematic scientific worldview of modern science, professional ethics and general cultural worldview. C12. Ability to present the results of their own scientific and scientific and technical activities, including through scientific publications. C13. Ability to convey to students modern knowledge and scientific results of their own research, including in the framework of scientific and pedagogical activities in the field of natural sciences. C14. Ability to intellectual creative activity aimed at obtaining new knowledge and (or) finding ways to apply them in the field of ecology, environmental protection and optimization of nature. C15. Ability to study and assess the state of populations as a real form of existence of species and one of the basic levels for ensuring the efficient functioning of ecosystems, conservation of biodiversity and the development and implementation of the principles of environmental management
7 – Program learning outcomes	
	PL01 Demonstrate a deep knowledge of the advanced conceptual and methodological foundations of the natural sciences, which makes it possible to rethink and deepen the science of the environment. PL02 Demonstrate mastery of general scientific concepts of modern science. PL03 To plan and implement in practice an original

	<p>independent scientific research, which is characterized by novelty, theoretical and practical value and contributes to the solution of significant problems of ecology, environmental protection and sustainable use of nature.</p> <p>PL04 Formulate, research and solve problems of ecology, environmental protection and sustainable use of nature using the scientific method of cognition.</p> <p>PL05 Independently develop innovative comprehensive research projects in the field of ecology, environmental protection and optimization of nature management.</p> <p>PR06 Apply methods of mathematical and geoinformation analysis and modeling of the current state and forecasting changes in ecosystems and their components.</p> <p>PL07 Independently use modern equipment for research in the field of ecology, environmental protection and sustainable use of nature.</p> <p>PL08. Communicate, including in a foreign language, in dialogue with the wider scientific community, students and the public in the field of ecology, environmental protection and optimization of nature.</p> <p>PL09 Communicate clearly and unambiguously professional knowledge, results of own research, substantiation and conclusions both orally and in writing for different audiences, both nationally and internationally.</p> <p>PL010 Apply modern technologies (including information) in scientific and scientific-pedagogical and ecological-educational activities.</p> <p>PR11 Identify leadership qualities, responsibility and full autonomy in the implementation of complex research projects.</p> <p>PL012 Implement the intellectual property right to the results of scientific and scientific-technical activities within the framework of scientific ethics.</p> <p>PL013 Be able to carry out a comprehensive analysis of the state of populations and assess the degree, nature of the negative impact of different types of anthropopression on the environment</p>
8. Forms of certification of higher education applicants	
Forms of certification of higher education applicants	<p>The form of attestation of the educational component is the fulfillment by the applicant of the curriculum of the educational-scientific program in full.</p> <p>The form of attestation of the scientific component is public defense of the dissertation for the degree of Doctor of Philosophy.</p>
Requirements to the qualification work	<p>The dissertation for the degree of Doctor of Philosophy is an independent detailed research that offers solutions to theoretical and / or practical topical environmental problems, the results of which make an original contribution to the amount of knowledge in modern</p>

	<p>ecology, environmental protection and sustainable use of nature and is characterized by scientific novelty, theoretical and practical significance.</p> <p>The main results of the dissertation must be tested, published in accordance with the requirements in force at the time of defense of dissertations, as well as tested for academic plagiarism.</p> <p>The dissertation and abstract should be posted on the website of the institution of higher education (scientific institution).</p>
Public defense requirements	<p>Requirements for the procedure and special conditions for conducting public protection are determined by the Cabinet of Ministers of Ukraine.</p> <p>The defense of the dissertation takes place in public at a meeting of the specialized Academic Council. Mandatory prerequisite for admission to the defense of the dissertation is the approbation of research results and main conclusions at scientific conferences and their publication in professional scientific journals, in accordance with current requirements.</p>
9 – Resource support for program implementation	
Staff support	<p>Scientific and pedagogical staff meets the requirements of current legislation of Ukraine. The scientific and pedagogical workers involved in the implementation of the educational program are employees of Sumy NAU, they are provided with advanced training and internships of scientific and pedagogical workers at least once every five years. 100% of scientific and pedagogical workers involved in the teaching of disciplines have scientific degrees and academic titles. The personnel potential of Sumy NAU allows to carry out training of applicants of the third level of higher education on a specialty</p> <p>101 "Ecology" and meets regulatory requirements.</p>
Material and technical support	<p>Logistics of the Faculty of Agrotechnology and Nature Management of Sumy NAU allows training of third-level higher education and meets regulatory requirements, the university has the equipment, facilities and software needed for field, laboratory and remote studies of the structure and properties of ecological systems of different levels and origins . Peculiarities of ESP are the possibility of conducting laboratory research on the basis of powerful laboratories of the university: "Educational and scientific PCR laboratories" within the Erasmus + KA2 project, "Electron microscopy", "Laboratory of ecological agriculture and nature management", and on the basis of nature reserves, subordinate to SNAU. Long-term experience of effective cooperation with environmental institutions, enshrined in cooperation agreements, also allows you to use their territory and material and technical base for the training of third-level higher education in the specialty "Ecology"</p>

Informative and methodical support	<p>The educational process of training higher education applicants is provided with methodological and informational materials in a sufficient amount in relation to regulatory needs. In addition, informational and educational-methodical support of all participants of the educational process is carried out through the university website (https://snau.edu.ua/), which contains information about educational programs, educational, scientific and educational activities, structural units, contacts, repository, scientific libraries and reading rooms, etc.</p> <p>All resources of the library of Sumy NAU are available through the university website and the library website (https://library.snau.edu.ua/), ordinary and electronic reading rooms of the SNAU library are provided with wireless Internet access. Applicants have free access to the repository of Sumy NAU (http://repo.snau.edu.ua/) and the use of the fund of scientific libraries of higher education institutions of Sumy, the National Library of Ukraine named after V.I. Vernadsky and others.</p> <p>In accordance with the order of the Ministry of Education and Science of №1213 dated 06.11.2018 "On granting access to higher education institutions and research institutions under the Ministry of Education and Science to electronic scientific databases", Sumy National Agrarian University was granted access to international scientometric databases Scopus and Web of Science.</p>
9 – Academic mobility	
National credit mobility	Based on bilateral agreements between Sumy NAU and universities of Ukraine agreements on academic mobility for teaching and research in universities and research institutions of Ukraine are concluded. Leading specialists of universities and research institutions of Ukraine may be involved in the management of scientific work of applicants for higher education on the terms of individual agreements.
International credit mobility	On the basis of bilateral agreements between Sumy NAU and higher educational institutions of foreign partner countries on the terms of cooperation agreements. Detailed information is presented on the website of Sumy National Agrarian University: https://snau.edu.ua/mizhnarodni-proekti/
Foreign studying applicants for higher education	Studying of third-level higher education students is carried out on general terms with additional language training. Sumy NAU has the right to train applicants for higher education with the opportunity to train foreigners and stateless persons. Training of applicants for the third (educational and scientific) level of higher education is carried out on general terms with additional language training, research and teaching staff have <i>B2 certificates</i> .

1. List of educational – scientific program components and their logical sequence

List of components

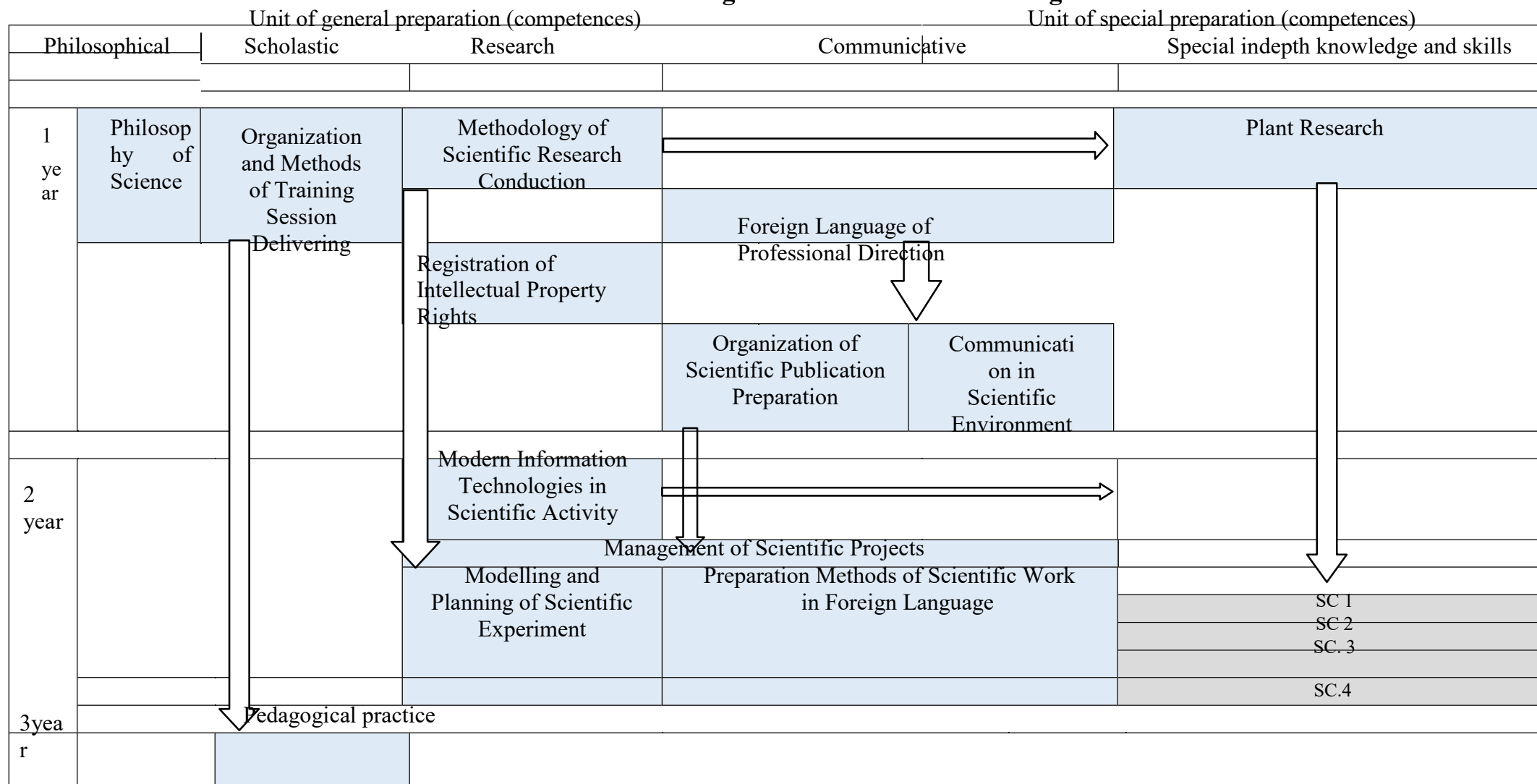
Code	Educational program components (academic disciplines, course projects (works), practices, qualification work)	Number of credits	Form of final control
1	2	3	4
Compulsory components			
CC 1.	Philosophy of science	3	Exam
CC 2.	Modern information technologies in scientific activity	3	Credit
CC 3.	Communications in the scientific environment	3	Credit
CC 4.	Methodology of scientific research	3	Credit
CC 5.	The plant in the experiment	3	Exam
CC 6.	The plant in the experiment	3	Credit
CC 7.	Registration of intellectual property rights	3	Exam
CC 8.	Organization and methods of training	3	Exam
CC 9.	Organization of preparation of scientific publications	3	Exam
CC 10.	Management of scientific projects	3	Exam
CC 11.	Foreign language for professional purposes	4	Exam
CC 12.	Methods of preparation of scientific papers in a foreign language	4	Exam
C 13	Pedagogical practice	4	Credit
Total number of compulsory components:		42	
Selective components			
SC 1.	Methods and organization of preparation and writing of the dissertation / Management of laboratory activity	3	Exam
SC 2.	Biology / Bioindication and biotesting	4	Credit
SC 3.	Ecology / Biosociology	4	Credit
SC 4.	Biometrics with the basics of modeling and forecasting of population processes / Resource Studies	4	credit
Total number of selective components		15	
TOTAL NUMBER OF EDUCATIONAL PROGRAM		57	

*Note: hereinafter - * changes in the curriculum for the training of foreign applicants for the third level of higher education*

Structural – logic scheme of ESP

Applicants for higher education have the right to choose the disciplines within the limits provided by the relevant educational program and the working curriculum, in the amount of not less than 25 percent of the total number of ECTS credits provided for this level of higher education.

Structural and logical scheme of PhD Trainings



Note: ** For the training of foreign applicants for the third level of higher education, changes in the structural and logical scheme are possible according to the agreements under the conditions of study at the third level of higher education in Sumy NAU for non-citizens of Ukraine

2. List of the normative documents on which the project of standard of the third (educational – scientific) level of higher education in specialty 101 “Ecology” is based

- Law of Ukraine of 01.07.2014 № 1556-VII "On higher education" [available at: <http://zakon4.rada.gov.ua/laws/show/1556-18>];
- Law of Ukraine of November 26, 2015 № 848 — VIII “On scientific and scientific-technical activity” [available at: <http://zakon3.rada.gov.ua/laws/show/848-19>];
- Resolution of the Cabinet of Ministers of Ukraine dated 29.04.2015 № 266 "On approval of the list of branches of knowledge and specialties in which the training of applicants for higher education" [available at: <http://zakon4.rada.gov.ua/laws/show/266-2015-n>];
- Resolution of the Cabinet of Ministers of Ukraine of 30.12.2015 № 1187 "On approval of the License conditions for educational activities of educational institutions" [available at: <http://zakon4.rada.gov.ua/laws/show/1187-2015-p/page>];
- Resolution of the Cabinet of Ministers of Ukraine of 23.11.2011 № 1341 "On approval of the National Qualifications Framework" [available at: <http://zakon4.rada.gov.ua/laws/show/1341-2011-p>];
- Resolution of the Cabinet of Ministers of Ukraine dated 29.04.2015 № 266 "On approval of the list of branches of knowledge and specialties in which the training of applicants for higher education" [available at: <http://zakon4.rada.gov.ua/laws/show/266-2015-n>];
- Resolution of the Cabinet of Ministers of Ukraine of 30.12.2015 № 1187 "On approval of the License conditions for educational activities of educational institutions" [available at: <http://zakon4.rada.gov.ua/laws/show/1187-2015-p/page>];
- Resolution of the Cabinet of Ministers of Ukraine of 23.11.2011 № 1341 "On approval of the National Qualifications Framework" [available at: <http://zakon4.rada.gov.ua/laws/show/1341-2011-p>];
- Resolution of the Cabinet of Ministers of Ukraine of March 23, 2016 № 261 "On approval of the Procedure for training applicants for higher education for the degree of Doctor of Philosophy and Doctor of Science in higher educational institutions (scientific institutions)" [available at: <http://zakon3.rada.gov.ua/laws/show/261-2016-n>];
- National Classifier of Ukraine: "Classification of economic activities" DK 009: 2010 [available at: <http://www.ukrstat.gov.ua/>];
- National Classifier of Ukraine: "Classifier of Professions" SC 003: 2010 DC 003: 2010 [available at: <http://www.dk003.com/>];
- Methodical recommendations for the development of standards of higher education, approved by the order of the Ministry of Education and Science of Ukraine from 01.06.2017 № 600 (as amended by the order of the Ministry of Education and Science of Ukraine dated 21.12.2017 № 1648), approved by the higher education sector of the Scientific and Methodological Council of the Ministry of Education and Science of Ukraine (Minutes of 29.03.2016 №3) [available at: <http://mon.gov.ua/activity/education/reforma-osviti/naukovo-metodichna-rada-ministerstva/metodichni-rekomendaciyi.html>].

*The Chairman of the project team
(guarantor of the program)*



**Doctor of biological science,
professor
Skliar Victoria Hryhorivna**

Matrix of responsency of determined educational-scientific program competencies to the descriptors of Level of the National Qualification Framework.

Competencies classifaction by NQF	Knowle dge	Skills	Communicati on	Autonomy and responsibility
General competencies				
C01. Ability to abstract thinking, analysis and synthesis.	+	+		
C02. Ability to communicate in the state language both orally and in writing			+	
C03. Ability to communicate in a foreign language			+	
C04. Ability to conduct research at the appropriate level.	+	+		
C05. Ability to search, process and analyze information from various sources.		+		+
C06. Ability to identify, pose and solve problems.		+		+
C07. Ability to work in an international context.			+	+
C08. Ability to work autonomously.		+	+	+
C09. Ability to develop and manage projects.			+	+
Special (professional) competencies				
C10. Ability to master concepts, theoretical and practical problems, history of development and current state of scientific knowledge in the field of ecology, environmental protection and optimization of nature.	+	+		
C11. Ability to form a systematic scientific worldview of modern science, professional ethics and general cultural worldview.	+	+		
C12. Ability to present the results of their own scientific and scientific and technical activities, including through scientific publications.		+	+	+
C13. Ability to convey to students modern knowledge and scientific results of their own research, including in the framework of scientific and pedagogical activities in the field of natural sciences.			+	+
C14. Ability to intellectual creative activity aimed at obtaining new knowledge and (or) finding ways to apply them in the field of ecology, environmental protection and optimization of nature.		+		
C15. Ability to study and assess the state of populations as a real form of existence of species and one of the basic levels for ensuring the efficient functioning of ecosystems, conservation of biodiversity and the development and implementation of the principles of environmental management	+	+		+

Matrix of responsency of determined educational-scientific program competencies to the outcomes of studying and competencies

[illegible]

PL07. Independently use modern equipment for research in the field of ecology, environmental protection and sustainable use of nature.					+				+						+	+
PL08. Communicate, including in a foreign language, in a dialogue with the general scientific community, students and the public in the field of ecology, environmental protection and optimization of nature.			+	+				+	+					+		
PL09. Communicate clearly and unambiguously professional knowledge, the results of own research, justifications and conclusions both orally and in writing for different audiences, both nationally and internationally.				+				+					+			
PL10. Apply modern technologies (including information) in scientific and scientific-pedagogical and ecological-educational activities.	+					+						+		+		+
PL11. Demonstrate leadership qualities, responsibility and full autonomy in the implementation of complex research projects.									+	+				+		+
PL12 Implement the intellectual property right to the results of scientific and scientific-technical activities within the framework of scientific ethics.								+					+		+	
PL13 Be able to carry out a comprehensive analysis of the state of populations and assess the degree, nature of the negative impact of different types of anthropopression on the environment					+		+		+			+			+	

**Matrix of support program outcomes to the relevant
components of educational-scientific program**

	PL01	PL02	PL03	PL04	PL05	PL06	PL07	PL08	PL09	PLO10	PLO11	PLO12	PLO13
C 1		*		*	*								
C 2			*	*	*	*				*	*		
C 3								*	*		*		
C 4	*	*	*	*	*	*	*			*			*
C 5	*			*	*		*			*			*
C 6	*	*				*	*						
C 7											*	*	
C 8								*	*				
C 9			*					*	*	*		*	
C 10			*	*				*			*	*	
C 11								*	*				
C 12			*	*				*	*				
C 13	*	*		*			*	*	*				