

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE  
Ternopil Volodymyr Hnatiuk National Pedagogical University**

APPROVED

by the Academic Council of the University,  
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No. 127, June 28, 2022.



**Bogdan BUYAK**

**EDUCATIONAL AND SCIENTIFIC PROGRAM  
BIOLOGY**

**the third (educational and scientific) level of higher education**

<b>Specialty</b>	<b>091 Biology</b>
<b>Branch of knowledge</b>	<b>09 Biology</b>

**Ternopil, 2022**

**LETTER OF AGREEMENT**  
**EDUCATIONAL AND SCIENTIFIC PROGRAM**

BRANCH OF KNOWLEDGE	09 Biology
SPECIALTY	091 Biology
LEVEL OF HIGHER EDUCATION	The third (educational and scientific) level
DEGREE OF HIGHER EDUCATION	Doctor of Philosophy
EDUCATIONAL QUALIFICATION	Doctor of Philosophy in Biology

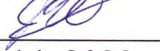
APPROVED

Chairman of the Scientific and  
Methodical Council of  
Ternopil Volodymyr Hnatiuk National  
Pedagogical University

  
Grygorii TERESHCHUK  
June 27, 2022

CHANGES AND ADDITIONS HAVE  
BEEN MADE by the project group of the  
ESP Biology of Ternopil Volodymyr  
Hnatiuk National Pedagogical  
University

Guarantor of the Educational Program  
(Head of the EP support group)

  
Vasyl HRUBINKO  
June 14, 2022.

## Preface

The Educational and Scientific Program “Biology” in the Specialty 091 Biology has been revised and supplemented by the Working Group consisting of:

**Vasyl V. Hrubinko**, Doctor of Biological Sciences, Professor, Head-Professor of the Department of General Biology and Methods of Teaching Natural Sciences at Volodymyr Hnatiuk Ternopil National Pedagogical University (TNPU) – Head of the working group, program guarantor.

**Nadia M. Drobyk**, Doctor of Biological Sciences, Professor, Dean of the Faculty of Chemistry and Biology, Professor of the Department of General Biology and Methods of Teaching Natural Sciences at TNPU.

**Oksana I. Bodnar**, Doctor of Biological Sciences, Professor, Professor of the Department of General Biology and Methods of Teaching Natural Sciences at TNPU.

**Roman A. Volkov**, Doctor of Biological Sciences, Professor, Head of the Department of Molecular Genetics and Biotechnology at Yuriy Fedkovych Chernivtsi National University.

**Khrystyna M. Kolisnyk**, a second-year student obtaining a degree at the third (educational-scientific) level of higher education in the Specialty 091 Biology at the Faculty of Chemistry and Biology.

**Yuriy I. Senyk**, PhD of Biological Sciences, Head of the Product and Innovation Research Group at CJSC Ternopil Dairy Plant.

**Leonid V. Kiverskyi**, CEO of LLC Trade-Agrokhim (Ternopil Oblast).

Reviews-feedback from external stakeholders:

**Serhii O. Afanasiev**, Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Biological Sciences, Professor, Director of the Institute of Hydrobiology of the NAS of Ukraine.

**Ivan M. Klishch**, Doctor of Biological Sciences, Professor, Vice-Rector for Research at I. Horbachevsky Ternopil National Medical University, Doctor of Biological Sciences, Professor.

## 1. Profile of the Educational and Scientific Program “Biology” in the Specialty 091 Biology

<b>1 – General Information</b>	
<b>Full name of the higher education institution and structural unit</b>	Volodymyr Hnatiuk Ternopil National Pedagogical University; the Department of General Biology and Methods of Teaching Natural Sciences
<b>Sciences Level of higher education</b>	Third (educational-scientific)
<b>Degree of higher education</b>	Doctor of Philosophy
<b>Field of knowledge</b>	09 Biology
<b>Specialty</b>	091 Biology
<b>Official name of the Educational Program</b>	“Biology”
<b>Educational qualification</b>	Doctor of Philosophy in Biology
<b>Qualification in the diploma</b>	Degree of higher education – Doctor of Philosophy. Specialty – 091 Biology. Educational program – “Biology”
<b>Form of study</b>	Full-time (daytime), part-time (distance learning)
<b>Language(s)</b>	Ukrainian, English
<b>Program cycle/level</b>	Ukrainian NQF – 8 level, EQF-LLL – 8 level, FQ-EHEA – third cycle
<b>Type of diploma and scope of Educational Program</b>	<p>Doctor of Philosophy (PhD) diploma, individual.</p> <p>The Educational and Scientific Program consists of two components – educational and scientific.</p> <p>The <i>educational component</i> of the program is implemented during the first two years of study and comprises <b>60 ECTS credits</b>. It includes two components: mandatory (MC) and elective (EC). The MC component consists of 45 ECTS credits (1350 hours), including 19 credits (570 hours) for general training, 18 credits (540 hours) for professional training, and 8 credits (240 hours) for practical training.</p> <p>The EC component consists of 15 ECTS credits (450 hours), including 3 credits (90 hours) for general training and 12 credits (360 hours) for professional training.</p>

	The <i>scientific component</i> of the program involves the student conducting their own scientific research under the guidance of one or two supervisors, with appropriate documentation of the obtained results in the form of a qualifying scientific work. This component is not measured in ECTS credits but is separately documented as an individual research plan and is an integral part of the curriculum.
<b>Prerequisites</b>	Master's Degree or a Specialist Degree based on entrance examinations is required according to the Admission Rules for postgraduate studies at Ternopil Volodymyr Hnatiuk National Pedagogical University. You can find more information about the entrance examinations on the university's website: <a href="http://tnpu.edu.ua/naukova-robota/PhD/programy-vstupnikh-vyprobuvan.php">http://tnpu.edu.ua/naukova-robota/PhD/programy-vstupnikh-vyprobuvan.php</a> . The specific requirements and regulations can be found in the Admission Rules document available at: <a href="http://tnpu.edu.ua/abiturient/pdf/2020/dodatok_10_do_pravyl_pryjomu.pdf">http://tnpu.edu.ua/abiturient/pdf/2020/dodatok_10_do_pravyl_pryjomu.pdf</a> .
<b>Availability of accreditation</b>	National Agency for Higher Education Quality Assurance, Ukraine. Certificate of accreditation for the Educational and Scientific Program "Biology" Certificate No. 609, September 10, 2020. Validity period: until July 1, 2026.
<b>The permanent web address for the description of the Educational Program</b>	<a href="http://surl.li/hxcxa">http://surl.li/hxcxa</a>
<b>2 – Aim of Educational and Scientific Program</b>	
To provide a conducive educational environment for a doctoral student in the field of Biological Sciences to acquire a comprehensive level of general and professional competencies necessary for solving complex biological problems through research and innovation. This environment should facilitate deep reflection on existing knowledge, creation of new integrated knowledge and/or professional practice, and enable the student to engage in research and innovation activities related to the identification and application of regulatory mechanisms in biological systems.	
<b>3 - Characteristics of the educational-scientific program</b>	
<b>Description of the subject area</b>	<i>Object of study:</i> biological systems at different levels of organization. <i>Theoretical content of the subject area:</i> structure, functions, and processes of life and regulatory mechanisms in biological systems at different levels of organization; patterns of ontogenesis, phylogenesis, and successional dynamics;

	<p>biodiversity and evolution of living systems, their interactions with the environment, reactions under different conditions of existence; the significance of living organisms in the biosphere, economy, healthcare, management of organismal life processes, and their modeling for assessing their state and practical utilization.</p> <p><i>Methods, methodologies, and technologies:</i> modern methodologies and research methods of biological objects at different levels of organization, investigation of their pathological states under different ecological situations.</p> <p><i>Tools and equipment:</i> means and methods of cultivation, models of experimental impact factors on organismal life, molecular-metabolic research, productivity of plants and animals, mathematical modeling of life processes.</p>
<b>Program orientation</b>	<p>The Educational and Scientific Program is research-oriented and has a focus on innovation. It encompasses the following key principles in educational activities: integrity, academic freedom, national and international mobility, transparency, and openness.</p>
<b>Main focus of the educational program</b>	<p>It is <i>aimed</i> at preparing a competitive professional who possesses a comprehensive set of knowledge, skills, and abilities to apply in professional activities related to monitoring the state, experimental manipulation, and forecasting and modeling of biological systems at different levels of organization.</p> <p>In addition, the program aims to prepare biology specialists who are capable of making informed decisions, working in teams, generating new ideas, conducting safe research and innovation activities, engaging in international activities in the national interests of Ukraine, justifying their worldview and public position, and being ready for self-education and lifelong professional development.</p> <p><i>Keywords:</i> Higher Education, third level, Biology, Biochemistry, Molecular Biology, Cytology, Hydrobiology, Microbiology, Plant Physiology, Methodology, research and innovation activities.</p>
<b>Program features</b>	<p>The Educational and Scientific Program includes the following:</p> <ul style="list-style-type: none"> <li>● Conducting research in various fields such as Botany, Plant Physiology, Biochemistry, Hydrobiology, Ichthyology, and Biotechnology.</li> <li>● Dynamism: based on the academic autonomy of the educational institution, program changes are made at least once a year through continuous monitoring of the labor</li> </ul>

	<p>market to ensure the preparation of professionals who meet its needs.</p> <ul style="list-style-type: none"> <li>● Implementation of the student’s right to an individual learning trajectory and free choice of educational disciplines.</li> <li>● Utilization of modern scientific communication systems, innovative technologies, social services in professional research and practical activities, and more.</li> </ul> <p>The conduct of scientific research involving doctoral students is ensured through the availability of scientific schools, established cooperation in the scientific and educational fields, and the presence of research laboratories. The scientific and pedagogical staff responsible for implementing the educational and scientific components of the program has undergone internships at Ukrainian and foreign scientific and educational institutions, provide guidance, and participate in national and international research projects.</p>
<b>4 - Employability of graduates</b>	
<b>Employability</b>	<p><i>Types of economic activities</i> (according to <b>KVED 009:2010</b>):  M. Professional, scientific, and technical activities  72.1 Research and experimental development in natural and technical sciences  P Education  85.4 Higher education</p> <p><i>Professional types of occupations</i> (according to <b>DK 003:2010</b>):  2211.1 Scientific researchers (Biology, Botany, Zoology, etc.)  2211.2 Biologists, botanists, zoologists, and related professionals  2310.1 Professors and associate professors  2310.2 Other university and higher education teachers</p>
<b>Academic rights of graduates</b>	<p>Education for development and self-improvement in the scientific and professional fields, as well as other related areas of scientific knowledge, includes obtaining a doctoral degree, studying at the 8<sup>th</sup> level of the National Qualifications Framework of Ukraine in related scientific fields, and participating in educational programs, research grants, and scholarships (including those abroad) that contain additional educational components.</p>
<b>5 – Teaching and Evaluation</b>	

<p><b>Teaching and Learning</b></p>	<p>The teaching and learning approach includes the following elements:</p> <ul style="list-style-type: none"> <li>● Application of modern educational technologies (interactive, critical thinking, project-based, portfolio, training, problem-based learning, simulation, case studies, etc.) to facilitate productive acquisition of competencies at different levels by learners, ensuring a learner-centered approach and the development of critical thinking skills.</li> <li>● Implementation of project-based learning with paired or group project execution and defense in the context of extensive group discussions.</li> <li>● Organization of productive interaction with scientific supervisors and academic staff involved in the educational process.</li> <li>● Involvement of renowned experts in the field of Biology for consultation with doctoral students.</li> <li>● Provision of information support for doctoral students' participation in competitions for scientific scholarships, awards, grants (including international opportunities).</li> <li>● Opportunities for doctoral students to participate in the preparation of research projects for competitions held by the Ministry of Education and Science of Ukraine and the National Research Foundation of Ukraine.</li> <li>● Direct involvement in the implementation of budgetary and initiative-based research projects.</li> </ul>
<p><b>Evaluation</b></p>	<p>The <i>educational component</i> of the program includes tests, essays, presentations, ongoing and modular assessments, credits, exams, defense of internship reports, preliminary examination of the dissertation, and defense of the dissertation. The final assessment of learning achievements is conducted through exams and/or credits based on the study of disciplines outlined in the curriculum. The assessment of academic achievements is done using the 100-point (rating) scale of ECTS, the national 4-point scale (“excellent”, “good”, “satisfactory”, “unsatisfactory”), and verbal (“pass”, “fail”) systems. Types of assessment include preliminary, ongoing, final, and self-assessment.</p> <p>The <i>scientific component</i> of the program involves the proper documentation of the dissertation manuscript, based on the results of scientific research, preliminary examination of the dissertation, public defense, and awarding of the academic degree of Doctor of Philosophy in the field of Biology (specialty 091 Biology).</p>
<p><b>6 - Program Competencies</b></p>	



<p><b>Integral competency (IC)</b></p>	<p><b>IC.</b> The ability to solve the complex tasks in the field of biology during research and innovation activities involves rethinking existing knowledge and creating new comprehensive knowledge. It also includes acquiring the methodology of scientific and scientific-educational activities, conducting independent scientific research, the results of which have scientific novelty, theoretical and practical significance. These results should be integrated into the global scientific community through the publications.</p>
<p><b>General competencies (GC)</b></p>	<p><b>GC 1.</b> The ability to develop and manage scientific and scientific-technical projects.</p> <p><b>GC 2.</b> The ability to form a systemic scientific worldview, professional ethics, and a general cultural outlook</p> <p><b>GC 3.</b> Acquisition of universal research skills, including oral and written presentation of the results of scientific research in Ukrainian and foreign languages.</p> <p><b>GC 4.</b> The ability to communicate in a foreign language (such as English or another language) at a level sufficient to present and discuss the results of scientific work in both oral and written forms. It also includes the ability to fully understand scientific texts in the foreign language.</p> <p><b>GC 5.</b> The ability to apply modern information technologies in scientific activities, search for and critically analyze the information.</p> <p><b>GC 6.</b> The ability to manage scientific projects and/or prepare proposals for funding scientific research, as well as register intellectual property rights.</p> <p><b>GC 7.</b> The ability for abstract thinking, analysis, and synthesis.</p> <p><b>GC 8.</b> The ability to generate new ideas (creativity) and conduct scientific research at an appropriate (competitive) level.</p> <p><b>GC 9.</b> The ability to work in an international scientific context.</p>
<p><b>Professional Competencies (PC)</b></p>	<p><b>PC 1.</b> The ability to review existing concepts in the modern biology through critical understanding and adaptation of newly developed methods and technologies, as well as the generation of original hypotheses.</p> <p><b>PC 2.</b> The ability to develop new models and conduct experiments aimed at addressing problems related to theoretical and applied tasks in biology, according to specific needs in scientific research.</p> <p><b>PC 3.</b> The ability to critically evaluate obtained results, make decisions, and recommend alternative strategies for addressing problems related to the creation and regulation of the life processes of biological objects, research methods, and technologies involving them.</p> <p><b>PC 4.</b> The ability to assess the risks associated with the</p>

implementation of modern technologies, including biotechnologies, for the natural environment, human health, their compliance with national and international standards, and practices.

**PC 5.** The ability to create tools and methodologies for scientific activities, evaluate and implement the results of modern developments, solutions, and achievements in the Natural Sciences into Biology.

**PC 6.** The ability to protect one's intellectual property rights, plan, and manage the process of implementing an intellectual product.

**PC 7.** The ability to organize scientific research and educational processes in higher education institutions, as well as to apply modern educational technologies.

**PC 8.** The ability to independently formulate a scientific problem in the field of modeling and creating artificial biological systems, their practical application, and/or regulatory mechanisms of biological systems, as well as to determine pathways for its resolution.

### **7 - Learning outcomes (LO)**

- LO 1.** To have conceptual and methodological knowledge in Biology and at the interface of subject areas, as well as research skills sufficient for conducting scientific and applied research at the level of global achievements in the specific field. To have ability to acquire new knowledge, and/or carry out innovations.
- LO 2.** To confidently present and discuss research results, scientific and applied issues in biology in both the national and foreign languages, and to skillfully reflect research findings in scientific publications in scientific journals.
- LO 3.** To formulate and test hypotheses; the appropriate evidence to support conclusions, including results from literature analysis, experimental studies (surveys, observations, experiments), and mathematical and/or computer modelling.
- LO 4.** To develop and investigate conceptual, mathematical, and computational models of processes and systems, effectively utilizing them to acquire new knowledge and/or create innovative products in biology and related interdisciplinary fields.
- LO 5.** To plan and conduct experimental and/or theoretical research in biology and related interdisciplinary fields, applying modern tools and techniques. To critically analyze the results of one's own research and the findings of other researchers in the context of the broader body of contemporary knowledge related to the investigated problem.
- LO 6.** To apply modern tools and technologies for information retrieval, processing, and analysis, including statistical methods for analyzing large and/or complex data sets, specialized databases, and information systems.
- LO 7.** To develop and implement scientific and/or innovative projects contributing to the re-evaluation of existing knowledge and practices and create new comprehensive knowledge and/or professional practices. These projects should

address essential theoretical and practical problems in Biology while adhering to academic ethics norms and considering social, economic, environmental, and legal aspects.

**LO 8.** To have a deep understanding of the general principles and methods of Biological Sciences, as well as the methodology of scientific research, and to apply them in one's own research in the field of Biology and in teaching practice.

**8 - Resource provision of the Educational and Scientific Program**

<b>Staffing</b>	The scientific and pedagogical staff involved in the educational-scientific program meeting the personnel requirements of the licensing conditions for conducting educational activities in higher education institutions. All of them are university staff members; 100 % hold academic degrees and scientific titles (84.6 % are Doctors of Science and Professors, 15.4 % are Candidates of Science and Associate Professors). They have confirmed levels of scientific and professional training, as well as proficiency in a foreign language at the B2 level according to the Common European Framework of Reference for Languages. All teachers of the program have active profiles in professional scientific networks such as ORCID, ResearcherID, and Google Scholar. They also demonstrate high publication activity, including in specialized journals indexed in Scopus and Web of Science databases.
<b>Material and technical support</b>	The material and technical facilities meet the licensing requirements for the provision of educational services in higher education and are sufficient to ensure the quality of the educational process. They include specialized educational laboratories, classrooms, scientific research laboratories (comparative biochemistry and molecular biology, ecotoxicology and bioindication, cytoembryology, plant physiology and microbiology, environmental biochemistry, ecology and biotechnology, chemistry of unsaturated compounds), agrobiological laboratory, plant morphology and systematics laboratory (herbarium), laboratory of prospective technologies for the creation and physicochemical analysis of new substances and functional materials (based at Lviv Polytechnic National University), Center for Aging and Metabolism Disorders Research (based at Vasyl Stefanyk Precarpathian National University), Research Laboratory of New Substances and Materials (based at Lviv Polytechnic National University) ( <i>as co-founders of the centers for shared use of scientific equipment under the patronage of the Ministry of Education and Science of Ukraine</i> ), sports hall, sports grounds, library, reading room, wireless internet access points, premises for academic staff, dormitories, and catering points at Ternopil Volodymyr Hnatiuk National Pedagogical

	University.
<b>Information and educational-methodical support</b>	<p>The official website of Ternopil Volodymyr Hnatiuk National Pedagogical University (TNPU) at <a href="http://tnpu.edu.ua/">http://tnpu.edu.ua/</a> provides comprehensive information about the educational-scientific program, academic, scientific, and educational activities, organizational units, admission rules, and contact information. Website users have access to all available resources of the TNPU library. The university offers wireless internet access points, an electronic resource base on Moodle, corporate email, educational and methodological materials such as syllabi, lecture texts, software, laboratory work topics and content, self-study questions, ongoing and final assessments, individual assignments, and learning materials from various sources.</p> <p>The personal web page of the Chemical-Biological Faculty of TNPU can be found at <a href="http://chem-bio.com.ua/">http://chem-bio.com.ua/</a>, and there is a mobile application called CHEM&amp;BIO Education available on Google Play (<a href="http://chem-bio.com.ua/chemandbio.apk">http://chem-bio.com.ua/chemandbio.apk</a>).</p> <p>TNPU provides test access to international scientific-metric databases such as Scopus and Web of Science.</p>
<b>9 – Academic mobility</b>	
<b>National credit mobility</b>	<p>The possibility within the academic exchange between Ternopil Volodymyr Hnatiuk National Pedagogical University (TNPU) and Ukrainian higher education institutions (according to the agreements reached) is to study, intern, and undergo practical training at the hosting university, with subsequent recognition of academic results of educational and/or educational-scientific activities at the university using the European Credit Transfer and Accumulation System (ECTS) (<a href="http://tnpu.edu.ua/naukova-robota/akadem-chna-mob-in-st.php">http://tnpu.edu.ua/naukova-robota/akadem-chna-mob-in-st.php</a>).</p> <p>Within the academic exchange between TNPU and Vasyl Stefanyk Precarpathian National University, students have the opportunity to participate in the “Open Online Lecture Hall” project on the Cisco Webex Meeting platform.</p>
<b>International credit mobility</b>	<p>Possible implementation of the international academic mobility program (according to the established agreements, <a href="http://tnpu.edu.ua/about/pidrozdyly/partners.php">http://tnpu.edu.ua/about/pidrozdyly/partners.php</a>) within the framework of the “Internationalization Strategy of V. Hnatiuk TNPU” (<a href="http://tnpu.edu.ua/about/public_inform/upload/2018/Stratehiia_internatsionalizatsii_NPU.pdf">http://tnpu.edu.ua/about/public_inform/upload/2018/Stratehiia_internatsionalizatsii_NPU.pdf</a>)</p>
<b>Education of foreign students in higher education</b>	Education for foreign students is envisaged in higher education.

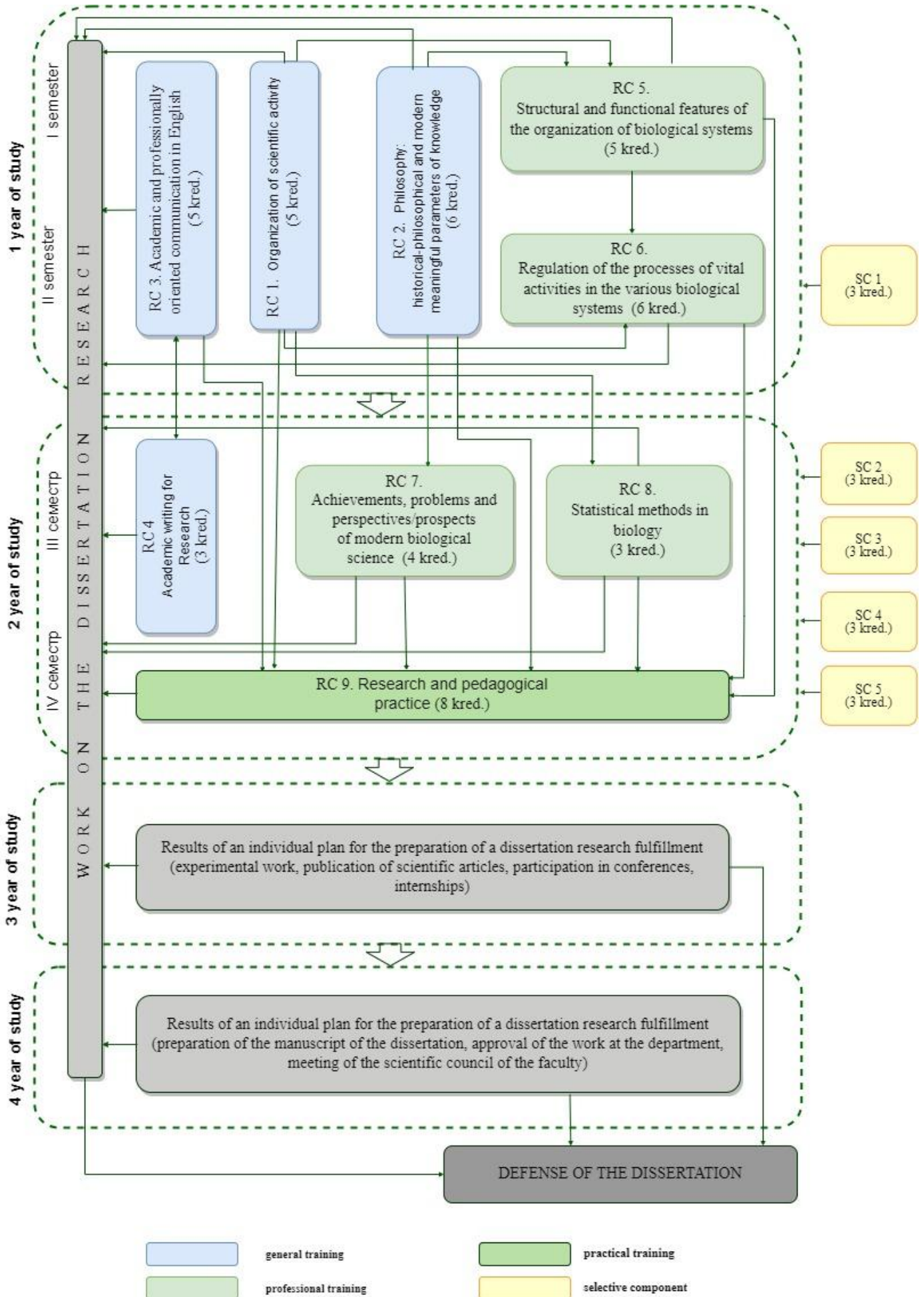
## 2. List of components of an educational and scientific program and their logical sequence

### 2.1. The list of components of an educational and scientific program

Code	Components of an educational-scientific program include academic disciplines and practical training	Number of credits	Form of final assessment
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
<b>1. MANDATORY COMPONENT OF AN EDUCATIONAL AND SCIENTIFIC PROGRAM</b>			
<b>General training</b>			
MC 1	Organization of scientific activity	5	Credit
MC 2	Philosophy: historical-philosophical and modern meaningful parameters of knowledge	6	Exam
MC 3	Professionally oriented communication in (English / German / French)	5	Credit, exam
MC 4	Academic writing in (English / German / French) for doctoral studies	3	Credit
<b>The volume of the mandatory component of general education</b>		<b>19</b>	
<b>Professional training</b>			
MC 5	Structural and functional features of the organization of biological systems	5	Exam
MC 6	Regulation of the processes of vital activities in various biological systems	6	Exam
MC 7	Achievements, problems and prospects of modern biological science	4	Credit
MC 8	Statistical methods in biology	3	Credit
<b>The volume of the mandatory component of professional training</b>		<b>18</b>	
<b>Practice</b>			
MC 9	Scientific-pedagogical practice	8	Credit
<b>The volume of the the mandatory component of practical training</b>		<b>8</b>	
<b>2. ELECTIVE COMPONENT OF AN EDUCATIONAL AND SCIENTIFIC PROGRAM</b>			
<b>General training</b>			
EC 1	An academic discipline from the university-wide catalog of elective disciplines of general education for educational-scientific preparation and programs of other educational levels of TNPU / other higher education institutions for external or internal academic mobility	3	Credit

<b>The volume of the elective component of general training</b>		<b>3</b>	
<b>Professional training</b>			
EC 2– EC 5	Four elective disciplines from the catalogue of elective disciplines of the professional training program “Biology” at TNPU / other higher education institutions for programs of external academic mobility.	12	Credit
<b>The volume of the elective component of professional training</b>		<b>12</b>	
<b>The total volume of the mandatory component</b>		<b>45</b>	
<b>The total volume of the elective component</b>		<b>15</b>	
<b>The total volume of the general training</b>		<b>22</b>	
<b>The total volume of the professional training</b>		<b>38</b>	
<b>The total volume of an educational and scientific program</b>		<b>60</b>	

## 2.2. Logical sequence of components of an educational and scientific program



### 3. Certification of candidates for the third (educational-scientific) degree of higher education

<b>Forms of certification of post graduate students</b>	The certification of candidates for the educational level of Doctor of Philosophy is carried out in the form of a public defense of the dissertation work. A mandatory requirement for admission to defense is the successful completion by the candidate of their individual study plan.
<b>Requirements for a dissertation for the degree of Doctor of Philosophy</b>	<p>A dissertation for the degree of Doctor of Philosophy is an independent and comprehensive research work that offers a solution to a relevant scientific problem in the field of Biology or at its intersection with related fields. It meets the requirements of originality, uniqueness, and novelty of the proposed ideas with a clear justification of the methodology of scientific inquiry. The research results are published in relevant publications.</p> <p>The dissertation work must not contain academic plagiarism, falsification, or fabrication and must undergo plagiarism detection checks.</p> <p>The dissertation and its abstract are published on the website of the educational institution.</p> <p>The dissertation work must comply with the requirements established by legislation.</p>
<b>Requirements for public defense</b>	The defense of a dissertation takes place publicly at a meeting of a Specialized Academic Council. A mandatory prerequisite for admission to the defense of a dissertation is the approval of the research results and main conclusions at scientific conferences and their publication in specialized scientific publications, including those included in scientometric databases, in accordance with the requirements of the Ministry of Education and Science of Ukraine.





## 5. Matrix of learning outcomes (LO) assurance with components of the educational and scientific program

№	Component	Learning outcomes							
		L01	L02	L03	L04	L05	L06	L07	L08
<b>1. MANDATORY COMPONENT</b>									
<b>1.2. General training</b>									
MC 1	Organization of scientific activity	+	+	+	+			+	+
MC 2	Philosophy: historical-philosophical and modern meaningful parameters of knowledge		+	+	+			+	+
MC 3	Professionally oriented communication in (English / German / French)	+	+						
MC 4	Academic writing in (English / German / French) for doctoral studies	+	+						
<b>1.2. Professional training</b>									
MC 5	Structural and functional features of the organization of biological systems	+				+		+	
MC 6	Regulation of processes of vital activities in various biological systems			+	+				
MC 7	Achievements, problems and prospects of modern biological science	+	+						+
MC 8	Statistical methods in biology	+			+		+		+
<b>1.3. Practice</b>									
MC 9	Scientific and pedagogical practice	+		+			+		+

## 6. Internal quality assurance system of the educational and scientific program

The principles and procedures for ensuring the quality of the educational-scientific program are presented in the regulatory documents of Volodymyr Hnatiuk Ternopil National Pedagogical University, specifically in:

- Regulations on Organization of Educational Process at Volodymyr Hnatiuk Ternopil National Pedagogical University: [http://tnpu.edu.ua/about/public\\_inform/upload/2019/Polozhennia\\_pro\\_orhanizatsiiu\\_osvit\\_noho\\_protseesu.pdf](http://tnpu.edu.ua/about/public_inform/upload/2019/Polozhennia_pro_orhanizatsiiu_osvit_noho_protseesu.pdf).

- Regulations on organization and implementation of student internships/practical training: [http://tnpu.edu.ua/about/public\\_inform/upload/2017/Polozhennia\\_pro\\_orhanizatsiiu\\_ta\\_pr\\_ovedennia\\_praktyk\\_studentiv.pdf](http://tnpu.edu.ua/about/public_inform/upload/2017/Polozhennia_pro_orhanizatsiiu_ta_pr_ovedennia_praktyk_studentiv.pdf).

- Regulations on Academic Mobility for Postgraduate Students and Academic Staff. Regulations on Implementation of the Right to Academic Mobility: [http://tnpu.edu.ua/about/public\\_inform/upload/2017/Polozhennia\\_pro\\_poriadok\\_realizatsii\\_prava\\_na\\_akademichnu\\_mobilnist.pdf](http://tnpu.edu.ua/about/public_inform/upload/2017/Polozhennia_pro_poriadok_realizatsii_prava_na_akademichnu_mobilnist.pdf)

- Regulation on internal quality assurance system in education: [http://tnpu.edu.ua/about/public\\_inform/upload/2019/Polozhennia\\_pro\\_systemu\\_vnutrishnoho\\_zabezpechennia%20yakosti.pdf](http://tnpu.edu.ua/about/public_inform/upload/2019/Polozhennia_pro_systemu_vnutrishnoho_zabezpechennia%20yakosti.pdf)

- Regulations on the center for quality assurance of education: [http://tnpu.edu.ua/about/public\\_inform/upload/Vchena\\_rada%2018-19/Polozhennia\\_pro%20proekt%20tsentra%20zabezpechennia%20yakosti%20osviti.pdf](http://tnpu.edu.ua/about/public_inform/upload/Vchena_rada%2018-19/Polozhennia_pro%20proekt%20tsentra%20zabezpechennia%20yakosti%20osviti.pdf)

The mechanism of creating and periodic review of an educational and scientific program is laid down in “Regulation on project groups and specialty support groups for development and maintenance of educational programs”, which is in effect at TNPU: [http://tnpu.edu.ua/about/public\\_inform/upload/2019/Polozhennia\\_pro\\_proektni\\_hrupy\\_ta\\_hrupy\\_zabezpechennia\\_spetsialnosti\\_z\\_rozroblennia\\_i\\_suprovodzhennia\\_osvitnikh\\_program.pdf](http://tnpu.edu.ua/about/public_inform/upload/2019/Polozhennia_pro_proektni_hrupy_ta_hrupy_zabezpechennia_spetsialnosti_z_rozroblennia_i_suprovodzhennia_osvitnikh_program.pdf).

Specialty Support Group 091 Biology" in English. This group is responsible for monitoring the job market, providing organizational support throughout the entire period of higher education training, analyzing its relevance and compliance with current regulatory documents, recommendations of the Ministry of Education and Science of Ukraine, employer requirements, and the community of learners. If necessary, they also develop changes to curriculum plans and other documentation. The suggestions for improving the educational and scientific program are provided by the Program Council of Specialty 091 Biology, acting as an advisory body to the guarantor of the educational and scientific program. This council is created by the Commission for Internal Quality Assurance of the Chemical and Biological Faculty: [http://tnpu.edu.ua/about/pidrozdily/monitoring/Instytutsiina\\_model\\_systemy\\_vnutrishnoho\\_zabezpechennia\\_jakosti\\_TNPU.pdf](http://tnpu.edu.ua/about/pidrozdily/monitoring/Instytutsiina_model_systemy_vnutrishnoho_zabezpechennia_jakosti_TNPU.pdf)

The mechanism for assessing the achievements of students and scientific-pedagogical staff based on ratings of research, methodological, and organizational work, as well as rating of instructors based on the results of student surveys, has been implemented. It is established in the following normative documents of TNPU (Ternopil Volodymyr Hnatiuk National Pedagogical University):

- Regulations on rating evaluation of higher education applicants at Volodymyr

Hnatyuk Ternopil National Pedagogical University:  
[http://tnpu.edu.ua/about/public\\_inform/upload/2017/Polozhennia\\_pro\\_reitynhove\\_otsiniuvannia\\_zdobuvachiv\\_vyshchoi\\_osvity.pdf](http://tnpu.edu.ua/about/public_inform/upload/2017/Polozhennia_pro_reitynhove_otsiniuvannia_zdobuvachiv_vyshchoi_osvity.pdf);

•Regulations on rating assessment of professional activity of scientific and pedagogical workers:

[http://tnpu.edu.ua/about/public\\_inform/upload/2019/Polozhennia\\_pro\\_reitynhove\\_otsiniuvannia\\_profesiinoi\\_diialnosti\\_naukovo\\_pedahohichnykh\\_pratsivnykiv.pdf](http://tnpu.edu.ua/about/public_inform/upload/2019/Polozhennia_pro_reitynhove_otsiniuvannia_profesiinoi_diialnosti_naukovo_pedahohichnykh_pratsivnykiv.pdf).

The results of the evaluation and rating are published on the website of TNPU:[http://tnpu.edu.ua/about/pidrozdily/monitoring/Rezultaty\\_monitorynhovykh\\_doslidzen\\_za\\_2018-2019\\_rr.pdf](http://tnpu.edu.ua/about/pidrozdily/monitoring/Rezultaty_monitorynhovykh_doslidzen_za_2018-2019_rr.pdf).

Ensuring of professional development of pedagogical, scientific, and scientific-pedagogical staff takes place on a regular basis. Work is being done to strengthen the practical component of professional development for scientific-pedagogical staff within the framework of postgraduate and informal education, including internships at enterprises, institutions, organizations within Ukraine and abroad, participation in international projects, grant programs, and training through certification programs.

A professional development program for teachers has been developed and implemented at TNPU:  
[http://tnpu.edu.ua/about/public\\_inform/upload/2019/Programa\\_profesijnoho\\_rozvytku\\_vykladachiv.pdf](http://tnpu.edu.ua/about/public_inform/upload/2019/Programa_profesijnoho_rozvytku_vykladachiv.pdf).

The seekers of the program "Biology" are provided with necessary resources (material base, educational and methodological support, the Moodle distance learning platform). Measures are being implemented to improve the organization of independent work for seekers in various forms of learning, including continuous monitoring, updating course disciplines, and the Moodle distance learning platform. The following are in place at TNPU:

- Regulations on organization of students' independent work:  
[http://tnpu.edu.ua/about/public\\_inform/upload/2017/Polozhennia\\_pro\\_samostiinu\\_robotu\\_studentiv.pdf](http://tnpu.edu.ua/about/public_inform/upload/2017/Polozhennia_pro_samostiinu_robotu_studentiv.pdf) ;
- Regulations on distance learning at TNPU:  
[http://tnpu.edu.ua/about/public\\_inform/upload/2018/Polozhennia\\_pro\\_dystantsiine\\_navchannia.pdf](http://tnpu.edu.ua/about/public_inform/upload/2018/Polozhennia_pro_dystantsiine_navchannia.pdf)
- Regulations on electronic educational and methodological complex of the educational discipline:  
[http://tnpu.edu.ua/about/public\\_inform/upload/2019/Polozhennia\\_pro\\_elektronnyi\\_navchalno\\_metodychnyi\\_kompleks\\_navchalnoi\\_dystrypliny.pdf](http://tnpu.edu.ua/about/public_inform/upload/2019/Polozhennia_pro_elektronnyi_navchalno_metodychnyi_kompleks_navchalnoi_dystrypliny.pdf).

The Information about the educational-scientific program, degrees of higher education, and professional qualifications is published on the website of TNPU. Additionally, TNPU utilizes the information system UA-Budget.

All of higher education in the educational and scientific program and the scientific-pedagogical staff involved in its implementation are required to sign a declaration of academic integrity. The qualification works of higher education seekers are checked for plagiarism through the MOODLE system. TNPU has the following in place:

- Regulations on prevention and detection of plagiarism and other academic dishonesty in educational and research work of students of higher education:  
<http://tnpu.edu.ua/naukova-robota/public%20information/Plag%20zdobyv.pdf>;

• The Academic Integrity, Ethics and Conflict Management Commission operates at TNPU:

[http://tnpu.edu.ua/about/public\\_inform/academ\\_dobrochesnist/polozhennia\\_pro\\_komisiyu\\_dobrochesn.jpg.pdf](http://tnpu.edu.ua/about/public_inform/academ_dobrochesnist/polozhennia_pro_komisiyu_dobrochesn.jpg.pdf).

Institutional model of the system of internal quality assurance of education:  
[http://tnpu.edu.ua/about/pidrozdily/monitoring/Instytutsiina\\_model\\_systemy\\_vnutrishnoho\\_zabezpechennia\\_jakosti\\_TNPU.pdf](http://tnpu.edu.ua/about/pidrozdily/monitoring/Instytutsiina_model_systemy_vnutrishnoho_zabezpechennia_jakosti_TNPU.pdf).

Program of measures to ensure the quality of education:  
[http://tnpu.edu.ua/about/public\\_inform/upload/2019/Programa\\_zakhodiv\\_iz\\_zabezpechennia\\_jakosti\\_osvity.pdf](http://tnpu.edu.ua/about/public_inform/upload/2019/Programa_zakhodiv_iz_zabezpechennia_jakosti_osvity.pdf).

## **7. List of regulatory documents on which the educational program is based:**

1. Law of Ukraine "On Higher Education." Available at: <https://zakon.rada.gov.ua/laws/show/1556-18>.
2. Law of Ukraine "On Scientific and Scientific-Technical Activity." Available at: <https://zakon.rada.gov.ua/laws/show/848-19#Text>
3. Methodological recommendations for the development of higher education standards. Order of the Ministry of Education and Science of Ukraine dated 01.06.2017 No. 600 (as amended by the Order of the Ministry of Education and Science of Ukraine dated 21.12.2017 No. 1648). Available at: <https://mon.gov.ua/storage/app/media/vishcha-osvita/rekomendatsii-1648.pdf>
4. National Classifier of Ukraine. Classifier of Professions DK 003: 2010. Available at: <https://zakon.rada.gov.ua/rada/show/va327609-10>.
5. Resolution of the Cabinet of Ministers of Ukraine dated 23.11.2011 No. 1341 "On Approval of the National Qualifications Framework." Available at: <https://zakon.rada.gov.ua/laws/show/1341-2011-%D0%BF>.
6. Resolution of the Cabinet of Ministers of Ukraine dated 29.04.2015 No. 266 "On Approval of the List of Fields of Knowledge and Specialties for Higher Education Training." Available at: <https://zakon.rada.gov.ua/laws/show/ru/266-2015-%D0%BF>.

Guarantor of the Educational Program

Vasyl HRUBINKO

The program was approved at a meeting of the Department of General Biology and Methods of Teaching Natural Sciences

Protocol No. 9, June 14, 2022

Head of the Department of General Biology and Methods of Teaching Natural Sciences

Vasyl HRUBINKO

The program is approved by the Academic Council of Faculty of Chemistry and Biology

Protocol No. 11, June 23, 2022

Head of the Faculty Council

Nadiia DROBYK

The Educational Program is recommended for implementation by the Academic Council of Ternopil Volodymyr Hnatiuk National Pedagogical University

Protocol No. 13, June 28, 2022

Academic Secretary of the University



Victoriia HEVKO