

Ministry of Education and Science of Ukraine
V. N. Karazin Kharkiv National University

Educational Professional Program

(Educational Professional / Educational Scientific)

GENETICS

(title)

Second (Master`s) level of higher education

(the first (bachelors`), the second (masters`), the third (PhD))

branch of knowledge

09 Biology

(code, name of branch of knowledge)

Specialty

091 Biology and Biochemistry

(code, name of specialty)

Specialization

Genetics

Approved by the Academic Council of
V.N. Karazin Kharkiv National University
"14" 05 2024, protocol № 10

Applied since 2024

by the order out of

"19" 05 2024. № 0114-1/178

Vice-rector for scientific and pedagogical
work

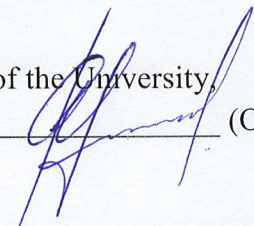
Oleksandr MOLOVKO



Kharkiv, 2024

LETTER OF AGREEMENT
educational and professional program
Genetics of the second (master's) level of higher education

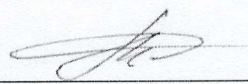
1.1. Scientific and methodological council of V. N. Karazin Kharkiv National University
protocol № 8 out of 21.05 2024

Chairman of the Scientific and Methodological Council of the University,
Vice-Rector for Educational and Methodological Work  (Oleksandr HOLOVKO)

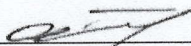
1.2. Academic Council of the School of Biology: protocol № 4 out of February 29 2024

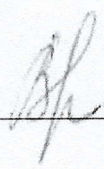
Chairman of the Academic Council of the School  (Yurii GAMULYA)

1.3. Scientific and Methodological Commission of the School of Biology:
protocol № 6 out of February 28 2024

Chairman of the scientific and methodical
commission of the school  (Olha TAHLINA)

1.4. Department of Genetics and Cytology:
protocol № 11 out of February 27 2024

Head of Department  (Lubov ATRAMENTOVA)

1.5. Guarantor of the educational program  (Natalia VOLKOVA)

PREFACE

Educational and professional program (EPP) «Genetics» for the training of applicants for higher education of the second (master's) level in specialty 091 Biology and Biochemistry contains the amount of ECTS credits required to obtain the appropriate degree of higher education; list of graduate competencies; normative and variable contents of training of higher education seekers, formulated in terms of learning outcomes; forms of attestation of applicants for higher education.

Developed by a working group consisting of:

Name	Job	Scientific degree, academic title
The head of the working group, the guarantor of the educational program		
Natalia VOLKOVA	Associate Professor of Genetics and Cytology, School of Biology	PhD, Associate Professor
Members of the working group		
Lubov ATRAMENTOVA	Professor of the Department of Genetics and Cytology, Faculty of Biology	DrSci , Professor
Volodymyr STRASHNYUK	Professor of Genetics and Cytology, School of Biology	DrSci , Senior Researcher
Olena BOYKO	Associate Professor of Genetics and Cytology, School of Biology	PhD, Senior Researcher

The following are involved in designing the educational program:

Representatives of applicants for higher education:

Kostyantyn Midlovets applicant for higher education under the educational and professional program "Genetics" 2023-2024

Olena Nahimova Graduated from the educational and professional program "Genetics" 2022-2023

Nataliia Shapovalova Graduated from the educational and professional program "Genetics" 2020-2021

Employers' representatives:

Natalia Bagatska Head of the Laboratory of Medical Genetics of the Institute of Child and Adolescent Health of the National Academy of Medical Sciences of Ukraine, Doctor of Biological Sciences, Professor of the Department of Genetics and Cytology, VN Karazin Kharkiv National University

Daria Loboiko Applicant for Higher Education under the educational and professional program "Genetics" 2019-2020, employee of ASTRAVIR TECHNOLOGY LLC "(2020-2022), "Medical laboratory CSD" (2022 -2024), «Continental Farmers Group» (since 2024 p.).

Natalia Kozak

Graduated from the educational and professional program "Genetics" 2014-2015, Università di Pavia - Dipartimento di Biologia e Biotecnologie "L. Spallanzani", PhD student.

Valeria Navrotska

The University of Texas at Austin, College of Natural Sciences, Department of Molecular Biosciences
Visiting Associate Professor

- The project development takes into account:
 - - requirements of the Standard of Higher Education of Ukraine: the second (master's) level of higher education, branch of knowledge 09 - Biology, specialty 091 - Biology (approved by the Order of the Ministry of Education and Science of Ukraine № 1458 of 21.11.2019);
 - - requirements of the Professional Standard for professions "Teacher of primary education", "Teacher of secondary education", "Teacher of primary education (with junior specialist/bachelor diploma)" (approved by the Order of the Ministry of Economic Development, Trade and Agriculture of Ukraine № 2736 out of 23.12.2020);
 - - requirements of the Professional Standard for the group of professions "Teachers of higher education institutions" (approved by the Order of the Ministry of Economic Development, Trade and Agriculture of Ukraine № 610 from 23.03.2021);
 - Handbook of qualification characteristics of employees' professions;
 - Classifier of professions DK 003: 2010 (<https://www.me.gov.ua/Profession/List?lang=uk-UA&id=d4162ef8-2771-4ac5-99ef-1d4b6f5336af&tag=KlasifikatorProfesii-Poshuk>);
 - - Order of the Ministry of Health of Ukraine dated 10.10.2023 No. 1769 "On approval of changes to the Handbook of qualification characteristics of workers' professions. Issue 78 "Health care" (<https://moz.gov.ua/article/ministry-mandates/nakaz-moz-ukraini-vid-10102023--1769-pro-zatverdzhennja-zmin-do-dovidnika-kvalifikacijnih-harakteristik-profesij-pracivnikiv-vipusk-78-ohorona-zdorov%e2%80%99ja>) (in Ukrainian)
 - materials of the International Standard Classification of Occupations 2008 (ISCO-08) (https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_172572.pdf)
 - materials of the International Union of Biological Sciences, <http://www.iubis.org/>;
 - materials of publications of the Journal of Biological Education (Journal of Biological Education, <https://www.tandfonline.com/toc/rjbe20/current>);
 - Information materials of the Genetics Society (The Genetics Society; <https://genetics.org.uk/mission-and-priorities/>);
 - Information materials of the European Society of Human Genetics (The European Society of Human Genetics; <https://www.eshg.org/>)
 - Recommendations of the Office of Methodological and Accreditation Work of V. N. Karazin KhNU (2022) (in Ukrainian);
 - REGULATIONS on educational programs for the training of students of higher education at V.N. Karazin Kharkiv National University (Approved by the decision of the Academic Council of V.N. Karazin Kharkiv National University dated April 11, 2022, protocol No. 7. Entered into force by order dated May 2, 2022 No. 0208-1/141) (in Ukrainian);
 - Resolution of the CMU of December 16, 2022 No. 1392 On making changes to the list of branches of knowledge and specialties for which higher education applicants are trained (<https://zakon.rada.gov.ua/laws/show/1392-2022-%D0%BF#Text>) (in Ukrainian);
 - Materials of the website of the National Qualifications Agency (<https://nqa.gov.ua/>) (in Ukrainian).
- **recommendations of reviews of external stakeholders:**

Kunakh VA, Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Biological Sciences, Professor, Head of the Department of Cell Population Genetics, Institute of Molecular Biology and Genetics of the National Academy of Sciences of Ukraine (2018);

Demidov SV, Doctor of Biological Sciences, Professor, Head of the Department of General and Medical Genetics, NSC "Institute of Biology and Medicine", Taras Shevchenko National University of Kyiv (2018)

Zhilkova ES, Candidate of Biological Sciences, Head of the Laboratory of Molecular Genetic Research of the Center for Human Reproduction "Clinic of Professor Feskov OM" (2020)

Pochernyaev KF, Doctor of Agricultural Sciences (03.00.15 - Genetics), Head of the Department of Physiology and Animal Health of the Institute of Pig Breeding and APV NAAS of Ukraine, a graduate of the Department of Genetics and Cytology in 1984 (2021)

Shevtsov SO, Candidate of Pedagogical Sciences, First Deputy Director of the Kharkiv Research Forensic Center of the Ministry of Internal Affairs of Ukraine (2021)

Dolgova TA, Candidate of Biological Sciences (03.00.15 - Genetics), Associate Professor, Deputy Director for Research of the Test Laboratory of AGROGEN NOVO LLC, a graduate of the Department of Genetics and Cytology (2021)

Petrushko M.P., Doctor of Biological Sciences, Director of the Medical Center LLC "DRT Clinic of Reproductive Medicine" (2022)

Alessandro Achilli, Ph.D., Professor of Genetics, Università di Pavia - Dipartimento di Biologia e Biotecnologie "L. Spallanzani" (2022)

Bulavyna V. S., candidate of veterinary sciences, head of the biological sector, of veterinary and soil science research of the laboratory of physical, chemical, biological and molecular genetic research of the National Scientific Center "Institute of Forensic Expertise named after Ex. Prof. M. S. Bokarius" of the Ministry of Justice of Ukraine (2023)

1. The profile of the Educational Program **GENETICS** in **091 Biology** specialty

1 – General information	
Full name of Higher Education Institution and Structural Unit	V. N. Karazin Kharkiv National University School of Biology
Official name of the Educational Program	Genetics
Higher Education Level	Second (master) level of Higher Education
Qualification name	Master of Biology and Biochemistry, Genetics
Type of Diploma and Curriculum volume	Master's diploma, single, 90 ECTS credits, period of study - 1 year and 4 months
Accreditation	Accredited by Ministry of Education and Science of Ukraine for the Second (master). УД 21016935 from 18 .09.2017 p. Valid to 01.07.2024.
Preconditions	Bachelor's/ Specialist's / Master's degree. Applicants should have a legal education document. Selection is carried out on a competitive basis according to the University's rules of admission.
Language(s) of teaching	Ukrainian, English
Period of validity of the Programme	1 year and 4 month
Internet address of permanent hosting of curriculum description	http://start.karazin.ua/programs/7/2/091/63 http://biology.karazin.ua/study-master-ukr.html
2 – Scope of the Educational Program	
Formation of the personality of a professional capable of solving complex, specialized, non-standard tasks and problems of practical, innovative and research nature, characterized by complex and uncertain conditions in the field of biology, genetics and related sciences, able to adequately select and apply laws, theories and methods of natural sciences, in particular biology and genetics, and to implement achievements in the professional and social spheres. Preparation of applicants for research, diagnostic practice, teaching and further education at the third level of higher education.	
3 - Description of the Educational Program	
Subject area (branch of knowledge, specialty, specialization)	Branch of knowledge 09-Biology Specialty 091 – Biology and biochemistry Specialization: Genetics
Orientation of Educational Program	The educational-professional program for the master provides in-depth special training of a professional in specialty “Biology and Biochemistry” with a specialization in Genetics.
Main focus of Educational Program and specialization	In-depth education in specialty Biology and Biochemistry with a specialization in Genetics. In-depth fundamental and specialized practical training of masters in biology: to provide students with knowledge, skills and understanding in biology with in-depth specialization in genetics, which will enable them to perform professional work independently; formation of specific professional competencies of a biologist specializing in genetics by implementing individual educational trajectories, strengthening interdisciplinarity and integrative education and the possibility of transforming individual units in accordance with the structure of employers' requests; preparation for successful mastering of programs

	<p>for researchers, developers, teachers, research managers, forensic experts/scientists.</p> <p>Object of study: structure, functions and processes in biological systems of different levels of organization (in-depth - genetic systems), patterns of onto- and phylogeny and succession dynamics (emphasis - genetic component); biodiversity and evolution of living systems (assessment by classical and molecular genetics), their interaction with the environment, reactions under different living conditions (evolution of genetic systems; highlighting the role of genotype and environmental factors in adaptation processes and pathogenesis)); the importance of living beings in the biosphere, national economy, health care.</p> <p><i>Key words: biology, genetics, teaching disciplines in higher education institutions.</i></p>
<p>Distinctive features of Educational Programme</p>	<p>Integration of professional training in the field of biology and genetics with innovation, research and project activities. The block of psychological and pedagogical disciplines is taught. Remote learning technologies are used.</p> <p>Requires special research practice, experimental one: the master's qualification project should contain an experimental part and be accompanied by analysis of the obtained data.</p> <p>The program is implemented in an active research environment.</p>
<p>4 – Employability and further education</p>	
<p>Employability</p>	<p>Professional activity in the field of biology, agriculture, medicine, biotechnology, nature protection and environmental management. Researcher, teacher of higher education.</p> <p>According to the National Classification of Ukraine: Classifier of professions (DK 003: 2010):</p> <p>2 Professionals</p> <p>22 Professionals in life sciences and medical sciences</p> <p>221 Professionals in life sciences and medical sciences</p> <p>2211 Biologists, botanists, zoologists and professionals of related professions</p> <p>2211.1 Biologist-researcher</p> <p>2211.1 Geneticist</p> <p>2211.1 Junior Research Fellow (Biology)</p> <p>2211.1 Researcher (biology)</p> <p>2211.1 Consultant (biology)</p> <p>2211.2 Biologists, botanists, zoologists and professionals of related professions</p> <p>2211.2 Biologist</p> <p>2211.2 Ecologist</p> <p>2211.2 Expert in ecology</p> <p>2211.2 Cytologist</p> <p>2213.1 Researcher in breeding and genetics of agricultural crops</p> <p>23 Teachers</p> <p>231 Teachers of universities and higher education institutions</p> <p>2310 Teachers of universities and institutions of higher education</p> <p>2310.2 Other teachers of universities and higher education institutions</p> <p>2310.2 Assistant</p> <p>2310.2 Teacher of higher education institution</p>

	<p>"Professionals with a higher non-medical education in medical and laboratory work in the field of health care"</p> <p>BACTERIOLOGIST BIOCHEMIST VIROLOGIST GENETICIST IMMUNOLOGY CYTOMORPHOLOGIST MICROBIOLOGIST PARASITOLOGY</p> <p>"Professionals with a higher non-medical education who work in the forensic medical examination office"</p> <p>Forensic immunologist expert Expert forensic toxicologist Expert forensic cytologist</p> <p>According to the International Standard Classification of Occupations 2008 (ISCO-08):213 Life science professionals 2131 Biologists, botanists, zoologists and related professionals 2132 Farming, forestry and fisheries advisers 2133 Environmental protection professionals</p> <p>23 Teaching Professionals 231 University and Higher Education Teachers 232 Vocational Education Teachers 235 Other Teaching Professionals</p>
Further education	<p>Education at the third (educational-scientific) level of higher education (8 levels of NQF, third cycle FQ-EHEA and 8 levels of EQF-LLL). Acquisition of qualifications in other specialties in the system of postgraduate education.</p>
5 – Teaching and assessment	
Teaching and learning	<p>Approach: student-centered; problem-oriented learning. Lectures are problematic, use analysis, synthesis, comparison, modeling, analogy, abstraction, concretization, systemic, historical and logical approaches. Laboratory and practical classes are conducted in small groups, involve the use of experimental research methods, statistical analysis of experimental data, information and communication technologies. Learning through practice (learning by doing). Educational and methodological support of independent work is carried out through the use of elements of distance learning: distance learning courses, electronic lectures, guidelines and tasks. The emphasis is on personal self-development, which will contribute to the formation of the need and willingness to continue self-education throughout life. <i>Methods, techniques and technologies:</i> methods of laboratory and field biological research, monitoring, bioinformatics, mathematical and statistical analysis of experimental data and interpretation of biological research results; information and communication technologies,</p>

	<p>methods of empirical research and modeling of biological systems, including at the molecular and cellular levels; research of biological systems in order to diagnose their functional state in changing conditions and in pathology, monitoring and evaluation of the state of the environment with the subsequent introduction of achievements in the economy and social sphere. The program provides mastering of methods of cytological, cytogenetic and molecular genetic diagnostics, acquaintance and mastering of separate methods of genetic engineering and assisted reproductive technologies.</p>
Assessment	<p>Assessment of students' academic achievements is carried out on a four-level (excellent, good, satisfactory, unsatisfactory) or two-level national scale (credited / not credited); 100-point system.</p> <p>Types of control:</p> <p>by levels: self-control, control at the level of the teacher, control at the level of the head of the department, control at the level of the dean's office, control at the level of the rectorate, state control;</p> <p>by term: operational (incoming, current, intermediate, final) and deferred.</p> <p>Forms of control: oral and written questioning, test, presentation of scientific work, defense of qualification work.</p>
6 – Programme Competences	
Integral competence	<p>Ability to solve complex problems and problems in the field of biology, in particular in genetics, and at the boundaries of subject areas, or in the process of education, which involves research and / or innovation and is characterized by uncertain conditions and requirements.</p>
General competences (GC)	<p>- competencies defined by the standard of higher education in the specialty:</p> <p>GC1. Ability to generate new ideas (creativity).</p> <p>GC 2. Ability to work in an international context.</p> <p>GC 3. Ability to perform professional functions and conduct research at the appropriate level in the field of biological sciences and at the boundaries of subject areas.</p> <p>GC 4. Ability to act on the basis of ethical considerations and in compliance with moral and ethical norms of professional activity and the need for intellectual honesty, socially responsible and conscious.</p> <p>GC 5. Ability to develop and manage projects, make decisions in complex and unpredictable conditions, which requires the use of new approaches and forecasting.</p> <p>GC 6. Ability to use modern information technology and analyze information in the field of biology and on the borders of subject areas.</p> <p>- competencies defined by the higher educational institution:</p> <p>GC 7. Flexibility of thinking. Acquires a flexible way of thinking that allows you to understand and solve tasks and problems, while maintaining a critical attitude to sustainable scientific concepts.</p> <p>GC 8. Innovative capabilities. Ability to perform initiative, including in situations of risk, and to assume full responsibility; the ability to find solutions in non-standard situations.</p> <p>GC 9. Popularization skills. Can prepare and conduct an oral presentation and write an understandable article based on the results of research, as well as on modern concepts in genetics for the general public (not specialists).</p> <p>GC 10. Ethics attitude. Has the necessary knowledge and understanding of the role of genetics as a component of biological science in society</p>

	<p>and in the context of job to work adequately in future professions and takes into account the effect of one's professional activities on social issues.</p> <p>GC 11. Conscious civic position. Is aware of the rights, interests and needs of a person and a citizen of the state and society. Able to implement them on a personal level and protect them in the performance of professional duties.</p>
<p>Professional competences of specialty (PC)</p>	<p>- competencies defined by the standard of higher education in the specialty:</p> <p>PC 01. Ability to use the latest advances in biology necessary for professional, research and / or innovation.</p> <p>PC 02. Ability to formulate modeling problems, create models of objects and processes on the example of different levels of living organization using mathematical methods and information technology.</p> <p>PC 03. Ability to use modern information technologies and analyze information in the field of biology and at the boundaries of subject areas using appropriate knowledge bases and software tools.</p> <p>PC 04. Ability to analyze and summarize the results of research at different levels of organization of living, biological phenomena and processes.</p> <p>PC 05. Ability to plan and perform experimental work using modern methods and equipment, analyze and interpret their results.</p> <p>PC 06. Ability to predict the development of modern biology based on a general analysis of the development of science and technology and knowledge of modern scientific issues in the field.</p> <p>PC 07. Ability to diagnose the state of biological systems based on the results of studies of organisms at different levels of the organization.</p> <p>PC 08. Ability to present and discuss the results of scientific and applied research, prepare scientific publications, participate in scientific conferences and other events.</p> <p>PC 09. Ability to apply copyright law for practical purposes, to adhere to the norms of academic integrity.</p> <p>- competences defined by the higher educational institution:</p> <p>PC 10. Deep knowledge and understanding. Uses the laws and principles of genetics in combination with the necessary higher-level mathematical tools to describe biological systems and processes that occur in them, including the effects of factors of different nature.</p> <p>PC 11. Problem solving. Able to formulate, analyze and synthesize solutions to scientific problems at the phenomenological level by decomposing them into components that can be studied separately in their more and less important aspects.</p> <p>PC 12. Modeling. Able to build appropriate models of biological systems (especially their genetic components) and processes, to study them to obtain new conclusions and deepen understanding of nature.</p> <p>PC 13. Computer skills. Able to develop an algorithm of action as a basis for a computer model, uses existing computer programs and is able to implement new ones.</p> <p>PC 14. Communication skills. Communicates with colleagues in the field of genetics and related biological fields on scientific achievements both at the general level and at the level of professionals, makes oral and written reports, discusses scientific topics in the native language and one of the languages of the European Union.</p>

	<p>PC 15. Research skills. Able to formulate (make presentations or present reports) new hypotheses and scientific problems in the field of genetics, choose appropriate directions and appropriate methods for their solution, taking into account available resources.</p> <p>PC 16. Ability to learn. Accepts newly acquired knowledge of genetics and related sciences and integrates them with existing ones. He is professionally oriented in a certain narrow field of genetics, which lies outside the chosen specialization. Seeks self-education and training.</p> <p>PC 17. Application of specialized knowledge. Effectively uses in practice various theories of learning, approaches to science management and business administration.</p> <p>PC 18. Teaching skills. Applies the basics of pedagogy and psychology in the educational process in higher education.</p> <p>PC 19. Mentoring and leadership skills. Able to mentor junior colleagues in improving research and teaching skills.</p>
7 – Programme Learning Outcomes (LO)	
	<p>- program learning outcomes defined by the standard of higher education in the specialty:</p> <p>LO 1. Knows the state and foreign languages at a level sufficient for communication on professional issues and presentation of the results of their own research.</p> <p>LO 2. Uses libraries, information databases, online resources to find the information needed to solve the problem.</p> <p>LO 3. Carries out coordinated work for the result in the team, taking into account public, state and industrial interests, determines their contribution to the cause.</p> <p>LO 4. Solves complex problems in the field of biology, generates and evaluates ideas.</p> <p>LO 5. Analyzes and evaluates the impact of biology on the development of society, provides professional advice in the field of biology.</p> <p>LO 6. Analyzes biological phenomena and processes at the molecular, cellular, organismal, population-species and biosphere levels in terms of basic general scientific knowledge, as well as using special modern research methods, including the use of appropriate equipment.</p> <p>LO 7. Describes and analyzes the principles of structural and functional organization, mechanisms of regulation and adaptation of organisms to the influence of various factors at the molecular and cellular levels.</p> <p>LO 8. Applies during research knowledge of the peculiarities of the development of modern biological science, the basic methodological principles of scientific research, methodological and technological tools for conducting research in specialization.</p> <p>LO 9. Plans research in the field of genetics, chooses effective research methods and their material support, applies appropriate methodological approaches and equipment.</p> <p>LO 10. Presents the results of scientific work in writing (in the form of a report, scientific publications, etc.) and orally (in the form of reports and defense of the report) using modern technology, argues ones position in the scientific discussion.</p> <p>LO 11. Carries out statistical processing, analysis and generalization of the obtained experimental data using software and modern information technologies used in the field of biology.</p> <p>LO 12. Uses innovative approaches to solve complex problems of biology under uncertain conditions and requirements.</p>

LO 13. Adheres to the basic rules of biological ethics, biosafety, biosecurity, assesses the risks of the latest biological, biotechnological and biomedical methods and technologies, identifies potentially dangerous organisms or production processes that may pose a threat of emergencies; knows the basic requirements of current legislation of Ukraine on the use of biological resources.

LO 14. Adheres to the norms of academic integrity in the study and conduct of scientific activities, knows the basic legal norms for the protection of intellectual property, uses regulations and regulatory and technical documentation in the field of research.

LO 15. Is able to independently plan and implement an innovative task and draw conclusions from its results.

LO 16. Critically comprehends theories, principles, methods from different branches of biology to solve practical problems and problems, responsibly, based on a creative approach to make decisions in complex and unpredictable conditions that require forecasting.

- program learning outcomes determined by the higher educational institution:

LO 17. Possesses knowledge of basic natural sciences, mathematics and information technology to the extent necessary for planning and conducting research in genetics and related fields;

LO 18. Applies pedagogical technologies at a level sufficient for the implementation of developed programs of disciplines for specialization in higher education institutions.

LO 19. Demonstrates and uses integrated modern ideas about the principles of structural and functional organization of biological systems (in more depth - genetic systems) of different systematic affiliation and level of organization, their phylogeny and ontogenesis, mechanisms of regulation and adaptation depending on environmental conditions;

LO 20. Demonstrates and uses in-depth knowledge of the patterns of heredity and variability at different levels of living organization, the relationship of genetics with other sciences and the place of genetics in human life and work in the healthcare system; in-depth ideas about the genome structure of different groups of organisms, the structure and functioning of chromosomes, the genetic structure of populations, genetic engineering technologies;

LO 21. Able to possess methods, techniques and protocols of classical and molecular genetic analysis, to carry out effective selection of methods and interpretation of the obtained results of their application in accordance with the set professional tasks;

LO 22. Is able to provide professional advice in the field of biology, including genetics;

LO 23. Understands the basic principles of the international scientific community: the principles of reviewing manuscripts of publications, measuring scientometric indices, organizing international cooperation, finding funding and submitting grant applications and the principles of their selection;

LO 24. Is able to make independent and responsible decisions in complex and unpredictable conditions that require forecasting, based on analysis and synthesis, taking into account critical remarks and based on a creative approach.

	LO 25. Consciously considers, implements and protects the rights, interests and needs of a person and a citizen of the state and society personally and in the performance of professional duties.
8 – Resource supply of Program realization	
Staff	Guarantor of the educational program: Volkova Natalia Yevgenivna - Candidate of Biological Sciences, Associate Professor of Genetics and Cytology Department, School of Biology, VN Karazin Kharkiv National University. Research and teaching staff with scientific degrees and / or academic titles (5 doctors of sciences, 15 candidates of sciences) are involved in the implementation of the program. Disciplines of professional orientation are taught by doctors and candidates of sciences in the specialty of genetics. Highly qualified specialists of related sciences and scientific and pedagogical workers are involved, who combine practical activities in the field of biology (genetics) with teaching. All scientific and pedagogical workers regularly improve their professional level, including by internship abroad.
Material and technical support	General organization of educational and extracurricular activities: educational buildings; thematic offices; dormitories; computer classes; food outlets; wireless access points to the Internet; multimedia equipment; gym, sports grounds. Specialized training laboratories: molecular genetic laboratory; cytogenetic laboratory; laboratory of developmental genetics; laboratory for culturing animal cells and tissues; bioinformatics laboratory; laboratory of cellular biochemistry and molecular genetics; laboratory of microbiology and microbiological boxing; laboratory for the diagnosis of plant diseases. Living collections: Collection of Drosophila stocks (National Heritage of Ukraine); Algotheca - a collection of algae samples; collection of silkworm breeds. Herbariums: Scientific Herbarium CWU (National Heritage of Ukraine); Scientific mycological herbarium CWU-Myc. Possibility of qualification work on the basis of specialized laboratories in partner institutions (under the terms of the agreement: Laboratory of Medical Genetics of the Institute of Child and Adolescent Health of the National Academy of Medical Sciences of Ukraine; Institute of Cryobiology and Cryomedicine of the National Academy of Sciences of Ukraine, Medical Center Medicine "; Center for Human Reproduction" Clinic of Professor Feskov OM "; Kharkiv Research Forensic Center of the Ministry of Internal Affairs of Ukraine). Tools and equipment: living objects, biological models, modern instruments and equipment for laboratory and field biological research, access to databases, specialized software and computer tools used in the field of biology and education.
Information, teaching and methodological support	official website of VN Karazin KhNU: https://karazin.ua/ ; wireless access points to the Internet; unlimited access to the Internet; Central Scientific Library; LMS Moodle; corporate mail; curricula and work plans; schedules of educational process; educational and methodical complexes of disciplines; didactic materials for independent and individual work of students in disciplines; internship programs; methodical instructions on performance of individual tasks, control and qualification works; criteria for assessing the level of training.
9 – Academic mobility	
National Credit Mobility	Applicants for higher education can exercise the right to academic mobility in higher education institutions and research institutions of Ukraine under agreements and the basis of an individual invitation.

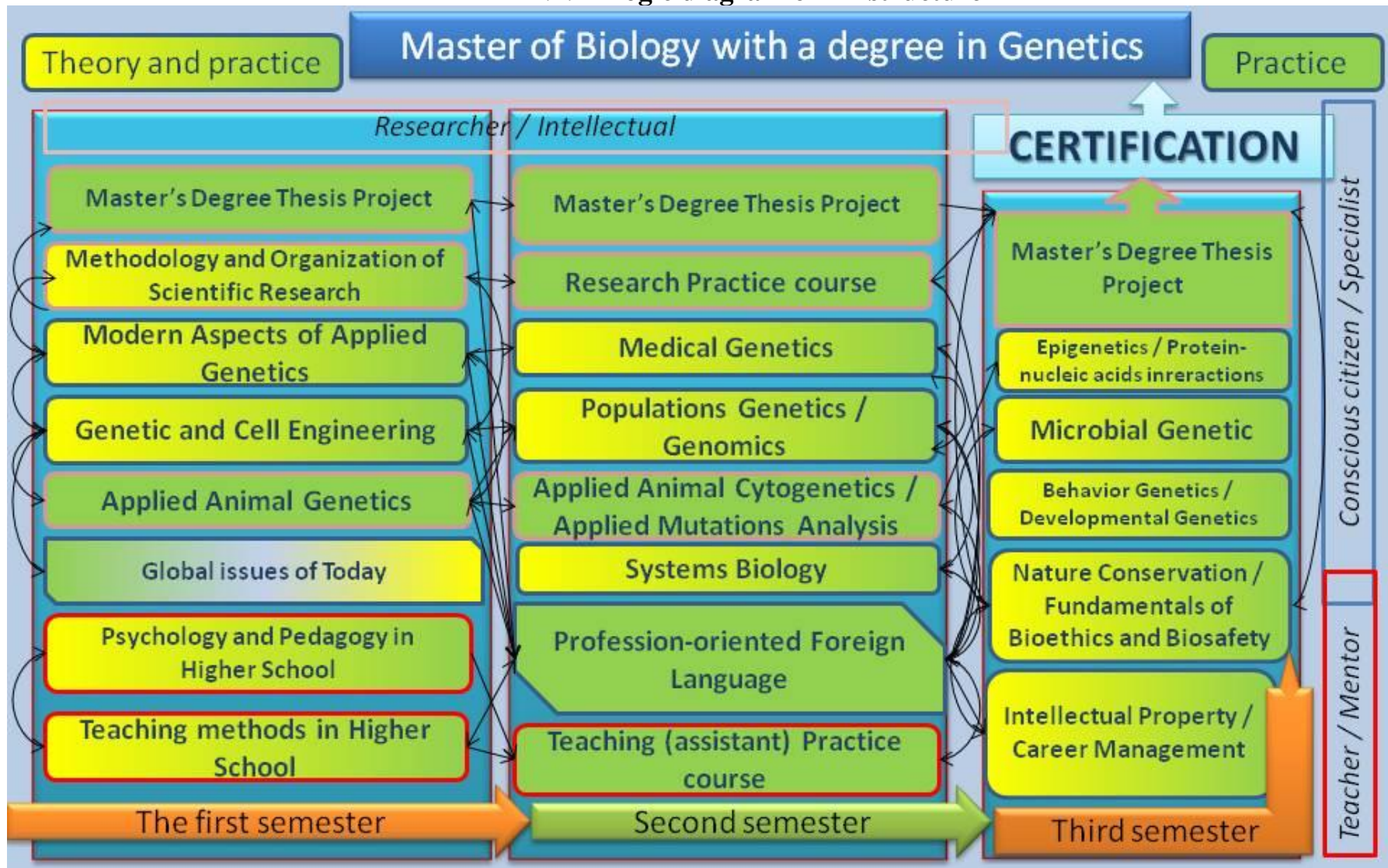
International Credit Mobility	Erasmus + programs, the DAAD German Academic Exchange Program, the Fulbright Scholarship Program, the Open Society Institute (Washington), etc., as well as individual invitations from higher education and research institutions outside Ukraine.
Teaching foreign applicants	Foreign citizens study on a paid basis at the expense of individuals or legal entities. All other conditions are regulated by the Rules of Admission to the University.

2. The list of components of the Educational Program and their logical consistency

2.1. The list of components of the Educational Program (EP)

Code	Components of the Educational Program (educational disciplines, course projects (work), practice courses, qualification work)	Amount of ECTS credits	Form of final assessment
1	2	3	4
Obligatory components of EP			
General training cycle			
OC 1.	Profession-oriented Foreign Language	3	Credit
OC 2.	Psychology and Pedagogy in Higher School	4	Credit
OC 3.	Current Global Issues	3	Credit
OC 4.	Systems Biology	5	Exam
OC 5.	Modern Aspects of Applied Genetics	5	Exam
OC 6.	Methodology and Organization of Scientific Research	4	Exam
Cycle of professional training			
OC 7.	Teaching methods in Higher School	4	Credit
OC 8.	Microbial Genetic	5	Credit
OC 9.	Genetic and Cell Engineering	4	Exam
OC 10.	Medical Genetics	4	Exam
OC 11.	Applied Animal Genetics	5	Credit
OC 12.	Teaching (assistant) Practice course	5	Credit
OC 13.	Research Practice course	5	Credit
OC 14.1.	Master's Degree Thesis Project	8	Credit
OC 14.2.	Master's Degree Thesis (defence)	-	Attestation
OC 15.	Attestation exam	-	Attestation
Total amount of obligatory components:		64	
Elective components of EP			
General training cycle			
EC 1	Intellectual Property / Career Management	4	Credit
EC 2	Nature Conservation / Fundamentals of Bioethics and Biosafety	4	Credit
Cycle of professional training			
EC 3	Behavior Genetics / Developmental Genetics	5	Exam
EC 4	Populations Genetics / Genomics	4	Exam
EC 5	Epigenetics / Protein-nucleic acids interactions	4	Exam
EC 6	Applied Animal Cytogenetics / Applied Mutations Analysis	5	Credit
The total amount of elective components:		26	
Curriculum volume:		90	

2.2. Logic diagram of EP structure



3. Form of attestation of graduates

Form of attestation of applicants for higher education in the specialty 091 "Biology and biochemistry" of the educational program "Genetics"

Attestation is carried out in the form of public defense of qualification thesis and attestation exam. Successful certification is completed by issuing the applicant with a document of the established standard for the award of a master's degree with the award of a qualification: Master of Biology and biochemistry, Genetics

Qualification thesis requirements

Qualification thesis should involve solving a complex specialized theoretical or practical problem of biology (specialization Genetics) with the use of fundamental principles and methods of natural sciences and systems analysis, which is characterized by complexity and uncertainty of conditions.

Qualification thesis should include analysis of the current state of the problem, working hypothesis, description of applied methods and results, analysis and theoretical justification of research results.

Qualification thesis must be written in a scientific style, in Ukrainian (or English).

Qualification thesis should not contain academic plagiarism, fabrication and falsification.

Qualification thesis must be published on the official website of the higher education institution or its subdivision, or in the repository of the higher education institution. If the thesis contains unpublished data, the abstract should be posted on the website or in the repository of the higher education institution, and the original text may be provided for review on request in the form of an application. Publication of qualification thesis containing information with limited access is carried out in accordance with the requirements of current legislation.

Qualification thesis involves public defense.

The attestation exam involves assessment of learning outcomes defined by the Standard of Higher Education of Ukraine: the second (master's) level of higher education, field of knowledge 09 - Biology, specialty 091 - Biology (approved by the Ministry of Education and Science of Ukraine № 1458 of 21.11.2019) and by this educational program.

The attestation exam is conducted in writing.

Requirements for the attestation exam

4. Correspondence matrix of Educational Program competences and components

	OC 1	OC 2	OC 3	OC 4	OC 5	OC 6	OC 7	OC 8	OC 9	OC 10	OC 11	OC 12	OC 13	OC 14	OC 15
IC	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GC 1									•		•	•	•	•	
GC 2	•				•	•		•	•	•	•	•	•	•	
GC 3					•	•	•	•	•	•	•	•	•	•	
GC 4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GC 5	•	•	•	•	•	•			•	•	•	•	•	•	
GC 6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GC 7				•	•	•		•	•	•	•	•	•	•	•
GC 8		•			•	•		•	•		•		•	•	•
GC 9					•			•	•	•	•	•		•	
GC 10		•	•		•	•	•	•	•		•				•
GC 11		•	•		•	•		•	•	•	•	•	•	•	•
PC 1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
PC 2				•	•	•						•	•		
PC 3	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
PC 4	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PC 5					•	•					•	•	•		
PC 6				•	•	•		•	•		•				
PC 7			•					•	•	•	•	•	•	•	
PC 8	•		•	•	•	•		•	•	•	•		•	•	
PC 9						•		•	•						
PC 10					•			•	•	•	•		•	•	
PC 11				•	•	•		•	•		•		•	•	•
PC 12				•	•	•		•	•		•		•	•	
PC 13				•	•	•		•	•	•	•		•	•	•
PC 14	•			•	•	•		•	•	•	•		•	•	
PC 15					•	•		•	•	•	•		•	•	
PC 16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
PC 17		•			•		•	•	•		•	•			•
PC 18		•			•		•	•	•		•	•			
PC 19		•			•		•	•	•		•	•			

