**Ministry of Education and Science of Ukraine**

**Open International University of Human Development ‘Ukraine’**



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| APPROVEDby decision of the Academic Councilof Open International University of Human Development ‘Ukraine’Protocol No 04 of July 2, 2020 |

**EDUCATIONAL PROFESSIONAL PROGRAM**

**‘Biology’**

**second (master's) level of higher education**

**in specialty 091 Biology**

**field of knowledge 09 Biology**

**Qualification: Master of Biology**

**Specialization: Microbiology - Immunology**

 The educational program is put into operation

 by order No 93 of July 9, 2020

 President of Open International

 University of Human Development ‘Ukraine’

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Petro Talanchuk |
| Kyiv 2020 |
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**LETTER OF AGREEMENT of
Educational and Professional Program
‘*Biology*’**

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| **Vice-Rector for Educational Work** | \_\_\_\_\_\_\_ | O.P. Koliada |
| **Head of Department of Methodical Work** | \_\_\_\_\_\_\_ | V.M. Baula |
| **Head of Scientific methodical Union** **of Biology and Pharmacy**, Dean of the Faculty of Biomedical Technology, PhD in Biological Science | \_\_\_\_\_\_\_\_\_ | V.O. Movchan |
| **Dean of the Faculty of Biomedical Technology** | \_\_\_\_\_\_\_\_\_ | V.O. Movchan |
| **Guarantor of Educational Program**:Head of Department of Microbiology, Modern Biotechnology and Immunology of the Faculty of Biomedical Technology, Doctor of Biological Science, Senior Researcher, Professor | \_\_\_\_\_\_\_\_\_ | T.I. Tuhai |
| **Employer’s representative**:Doctor of Biological Science, Senior Researcher, Leading Researcher of Department of General and Soil Microbiology of the Institute of Microbiology and Virology of D.K. Zabolotnoho of the National Academy of Science of Ukraine | \_\_\_\_\_\_\_\_\_ | L.O. Biliavska |
| Doctor of Medical Science, Professor,President of the Institute of Clinical Radiology of the National Research Center for Radiation Medicine of National Academy of Medical Sciences of Ukraine, Honored Worker of Science and Technology of Ukraine, Laureate of the State Prize of Ukraine in the Field of Science and Technology | \_\_\_\_\_\_\_\_\_ |  A.A. Chumak |
| Chief Physician of Skin-Venerological Clinic No 3 | \_\_\_\_\_\_\_\_\_ | O.O. Kashevarova |
| Representative of the students government: |  |  |
| graduate student of the group МB-19-1мin speciality 091 ‘Biology’ | \_\_\_\_\_\_\_\_\_ | V.O. Herasymniuk |

**FOREWORD**

Developed with association of the project group consisting of:

1. Tuhai Tetiana Ivanivna (director) – Head of Department of Microbiology, Modern Biotechnology and Immunology of the Faculty of Biomedical Technology, Doctor in Biological Science, Senior Researcher, Professor;

2. Kozlova Iryna Panasivna – Professor of Department of Microbiology, Modern Biotechnology and Immunology of the Faculty of Biomedical Technology, Doctor in Biological Science, Senior Researcher;

3. Melezhyk Olha Viktorivna – Associate Professor of the Department of Microbiology, Modern Biotechnology and Immunology of the Faculty of Biomedical Technology, PhD in Biological Science.

Recommended by the Scientific and Methodological Association for Biology and Pharmacy consisting of:

1. Movchan Valentyna Oleksiivna (Head) – Dean of the Faculty of Biomedical Technology, PhD in Biological Science;

2. Tuhai Tetiana Ivanivna – Head of Department of Microbiology, Modern Biotechnology and Immunology of the Faculty of Biomedical Technology, Doctor in Biological Science, Senior Researcher, Professor;

3. Novykov Dmytro Oleksiiovych – Head of the Department of Pharmacy of the Faculty of Biomedical Technologies, Doctor in Pharmaceutical Science, Professor;

4. Melezhyk Olha Viktorivna – Associate Professor of the Department of Microbiology, Modern Biotechnology and Immunology of the Faculty of Biomedical Technology, PhD in Biological Science;

5. Iliuk Nataliia Anatoliivna – Associate Professor of Department of Microbiology, Modern Biotechnology and Immunology of the Faculty of Biomedical Technology, PhD in Agricultural Science;

6. Katynska Maryna Heorhiivna – Associate Professor of Department of Pharmacy of the Faculty of Biomedical Technologies, PhD in Pharmaceutical Science;

7. Serhiichuk Nataliia Mikolaivna – Senior Lecturer of Department of Microbiology, Modern Biotechnology and Immunology of the Faculty of Biomedical Technology.

Reviews of external stakeholders[[1]](#footnote-1):

1. Kashevarova O.O., Chief Physician of Skin and Venerological clinic No 3;
2. Chernenko O.D., PhD in Biological Science, Head of the Immunological Laboratory of the Kyiv City Clinical Oncology Center;
3. Talko V.V., PhD in Medicine, Professor, Director of the Institute of Experimental Radiology of the State Institution ‘National Research Center for Radiation Medicine of the National Academy of Medical Sciences of Ukraine’;
4. Ihnatenko Y.V., Assistant Biologist of the Hematology Laboratory of ‘CSD LAB’ LLC, Master of Biology, Graduate of the University ‘Ukraine’ in year 2020.

The composition of the project group is approved by order of the University ‘Ukraine’ on 16th April 2020. No 58.

The content of the educational program was considered at the meeting of the Academic Council of the Faculty of Biomedical Technologies (Protocol No 4, 26 June, 2020).

The content of the educational program was considered at a meeting of the Scientific and Methodological Association for Biology and Pharmacy (Protocol No 5, 26 June, 2020).

1. **Profile of the Educational Program in the Specialty 091 ‘Biology’**

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| **1 – General Info** |
| **Full name of the higher education institution and structural unit** | Open International University of Human Development ‘Ukraine’Faculty of Biomedical TechnologiesDepartment of Microbiology, Modern Biotechnology and Immunology |
| **Level of higher education** | The second (master's) level |
| **Degree of higher education and title of qualification in the original language** | MasterMaster of Biology |
| **The official name of the educational program** | Biology |
| **Forms of education** | full-time, part-time |
| **Educational qualification**  | Master of Biology  |
| **Professional qualification** | Not provided  |
| **Qualification in the diploma** | Degree of higher education - MasterSpecialty - 091 BiologySpecialization - Microbiology-ImmunologyQualification: Master of BiologyEducational and professional program ‘Biology’ |
| **Type of diploma and scope of educational program** | Master's degree, single, 90 ECTS credits,term of study - 1 year 6 months  |
| **Availability of accreditation** | The specialty of the Ministry of Education and Science of Ukraine is accredited.Certificate of accreditation НІ № 1189875 in accordance with the decision of the Accreditation Commission of May 28, 2015 No 116.The certificate is valid until July 1, 2020 |
| **Cycle/level** | NQF of Ukraine – level 7, FQ-EHEA – second cycle, ЕQF-LLL – frame qualification level 7 |
| **Prerequisites** | Presence of the first (bachelor's) level of higher education (bachelor's, specialist's, master's degree (in related specialties)) |
| **Language(s) of instruction** | Ukrainian, English  |
| **Term of the educational program** | 2020-2022  |
| **Internet link of the permanent placement of the description of the educational program** | <https://ab.uu.edu.ua/NM_zabezpechennya_specialnostey_2020-21> |
| **2 – The Purpose of the Educational Program** |
| Formation of specialists with general professional competencies necessary to solve complex specialized tasks and practical problems in the field of biology (microbiology-immunology) or in the learning process, characterized by complexity and uncertainty of conditions and involve the application of laws, theories and methods of natural sciences, their application in conducting research and implementation of innovations, organizing the activities of the biological industry and solving practical problems of microbiological and immunological profile. |
| **3 – Characteristics of the Educational Program** |
| **Subject Area (Field of Knowledge, Specialty, Specialization (if available)** | Discipline: **09 ‘Biology’**Specialty: **091 ‘Biology’**Specialization: **‘Microbiology – immunology’***Object of study:* structure, functions and vital processes of biological systems of different levels of organization, patterns of ontogeny and phylogeny and succession dynamics; biodiversity and evolution of living systems, their interaction with the environment, reactions under different living conditions; importance of living beings in the biosphere, national economy, health care.*Learning objectives:* training of specialists capable of solving complex specialized problems and practical problems in the field of biology or in the learning process, characterized by complexity and uncertainty of conditions and involving the application of laws, theories and methods of natural sciences.*Theoretical content of the subject area:* structure, functions and processes of life, systematics, methods of research of non-cellular life forms, prokaryotes and eukaryotes. Structural and functional characteristics of biological systems at different levels of the organization. Mechanisms of preservation, realization and transfer of genetic information in organisms. Forms of relationships between micro- and macroorganisms. Evolutionary ideas of the organic world. Structure and functions of the immune system, mechanisms of immune reactions, their regulation and control. Concepts, notions, principles, laws of modern biological science and their use to assess the state of biological systems of different levels of organization, presentation and use of biological research results.*Methods, techniques and technologies:* methods of laboratory and field biological research, monitoring, bioinformatics, mathematical and statistical processing of experimental data and interpretation of biological research results, information and communication technologies, methods of empirical research and modeling of processes and phenomena of biological systems of different levels of organization.*Tools and equipment:* living objects, biological models, modern instruments and equipment for laboratory and field biological research, databases, specialized software and computer tools. |
| **Orientation of the Educational Program** | The program has an interdisciplinary nature and consists of disciplines of general, professional and practical training.The program offers a comprehensive approach to the implementation of activities in the field of science and education and implements it through training and practical training. The initial disciplines included in the program are focused on current areas in which further professional career of the applicant is possible. |
| **The Main Focus of the Educational Program and Specialization** | The main purpose of the educational and professional program is to train highly qualified personnel who would have deep solid knowledge to perform professional tasks of educational and innovative nature in the field of modern biological science, implementation of in-depth fundamental, specialized and practical training of masters in biology.The program allows to study comprehensively the educational sphere specifics, to emphasize the acquisition of diverse knowledge, skills and abilities in the field of biological science, which provides a certain employment, the possibility of further education and career growth.*Key words: biology, microbiology, immunology, molecular biology, biotechnology.* |
| **Features of the Program** | Determined by the peculiarity of the profile of the future graduate in biology, for the preparation of the master's degree is required industrial and industrial undergraduate practice in the volume of not less than 10% of the educational program.At least 35% of the educational program should be directed to the acquisition of general and special competencies in the specialty ‘Biology’, defined by the Standard of Higher Education. |
| **4 – Suitability of Graduates to Employment and Further Training** |
| **Suitability for Employment** | Professional activity in the field of biology, microbiology, immunology, agriculture, medicine, biotechnology, nature protection and rational use of nature at enterprises, institutions, organizations of the relevant profile, various activities and forms of ownership. |
| **Further Training** | Continuation of education at the third (educational and scientific) level; receiving postgraduate education in related and other specialties; certification training; academic mobility. |
| **5 – Teaching and Assessment** |
| **Teaching and Learning** | Student-centered learning, self-study, problem-oriented learning, learning through practice (training laboratories and production). The main forms of the educational process: lectures, seminars, practical classes, laboratory work, academic papers, production and production undergraduate practice, independent work, consultations with teachers, as well as a combination of lectures, practical classes, solving situational problems, trainings, cases, performance projects, research works.During the third semester, credits are provided for the preparation of qualifying work, which is presented and discussed through public defense. |
| **Grading** | A comprehensive system of testing knowledge of academic disciplines and industrial practices includes:* current and intermediate control;
* self-control;
* border control;
* evaluation of the results of independent work;
* final semester control.

Assessment of higher education seekers involves:* assessment takes place on a national scale (excellent, good, satisfactory, unsatisfactory; enrolled, uncredited), 100-point scale and ECTS scale (A, B, C, D, E, F, FX);
* assessment of higher education seekers can demonstrate the degree of achievement of their planned learning outcomes;
* evaluation criteria and methods, as well as evaluation criteria are made public in advance;
* the assessment of higher education applicants is consistent, transparent and carried out in accordance with established procedures.
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| **6 – List of Graduate Competencies** |
| **Integral Competence** | Ability to solve complex problems and problems in the field of biology during professional activities or in the learning process, which involves research and / or innovation and is characterized by uncertainty of conditions and requirements. |
| **General Competencies (GC)** | GC 1. Ability to work in an international context.GC 2. Ability to use information and communication technologies.GC 3. Ability to generate new ideas (creativity).GC 4. Ability to act on the basis of ethical considerations (motives).GC 5. Ability to develop and manage projects.GC 6. Ability to conduct research at the appropriate level. |
| **Special (Professional, Subject) Competencies** | SC 1. Ability to use the latest advances in biology necessary for professional, research and / or innovation.SC 2. The ability to formulate modeling problems, to create models of objects and processes on the example of different levels of living organization using mathematical methods and information technology.SC 3. Ability to use modern information technology and analyze information in the field of biology and at the boundaries of subject areas.SC 4. Ability to analyze and summarize the results of research at different levels of organization of living, biological phenomena and processes.SC 5. Ability to plan and perform experimental work using modern methods and equipment.SC 6. Ability to predict the direction of development of modern biology on the basis of a general analysis of the development of science and technology.SC 7. The ability to diagnose the state of biological systems based on the results of studies of organisms at different levels of organization.SC 8. Ability to present and discuss the results of scientific and applied research, prepare scientific publications, participate in scientific conferences and other events.SC 9. Ability to apply copyright law for practical purposes.SC 10. The ability to use the results of scientific research in practice.Additionally:SC 11. Ability to work with special laboratory equipment, media, samples, measuring equipment and the ability to organize and conduct microbiological and immunological analysis in the laboratory.SC 12. Ability to apply modern methods and methodological approaches to create a microbiological product for its practical application.SC 13. The ability to understand the principles of laboratory equipment, to have advanced methods of its operation.SC 14. In-depth understanding of the structure and functioning of microorganisms and their role in biosphere processes.SC 15. Ability to use special, professionally-profiled knowledge and practical skills to develop new and improve existing methods and techniques of microbiological and immunological analysis.SC 16. Ability to apply modern microbiological and immunological approaches in diagnosis and treatment.SC 17. Ability to develop and implement new effective methods of labor organization in accordance with the requirements of life safety and labor protection, to ensure environmental cleanliness.SC 18. Ability to identify and solve a wide range of problems and tasks of the microbiological field by understanding their basics and conducting theoretical and experimental research.SC 19. Ability to communicate with specialists in the field of biology, the ability to lead a discussion on professional topics and teamwork skills. |
| **7 – Program Learning Outcomes** |
| PLO 1. To speak the Ukrainian and foreign languages ​​at a level sufficient for communication on professional issues and presentation of the results of own research.PLO 2. To use libraries, information databases, Internet resources to search for the necessary information.PLO 3. To carry out coordinated work for the result in the team, taking into account public, state and industrial interests.PLO 4. To solve complex problems in the field of biology, generate and evaluate ideas.PLO 5. To analyze and evaluate the impact of biology on the development of society.PLO 6. To analyze 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.PLO 7. To describe and analyze the principles of structural and functional organization, mechanisms of regulation and adaptation of organisms to the influence of various factors.PLO 8. To apply knowledge of the peculiarities of the development of modern biological science, the basic methodological principles of scientific research, methodological and methodological tools for conducting research in specialization during research.PLO 9. To plan scientific researches, to choose effective methods of research and their material maintenance.PLO 10. To present the results of scientific work in writing (in the form of a report, scientific publications, etc.) and orally (in the form of reports and report defense) using modern technologies, to argue their position in the scientific discussion.PLO 11. To carry out statistical processing, analysis and generalization of the received experimental data with use of software and modern information technologies.PLO 12. To use innovative approaches to solve complex problems of biology under uncertain conditions and requirements.PLO 13. To adhere to the basic rules of biological ethics, biosafety, biosecurity, assess the risks of the latest biological, biotechnological and biomedical methods and technologies, to identify potentially dangerous organisms or production processes that may pose a threat of emergencies.PLO 14. To adhere to the norms of academic integrity in the study and scientific activities, to know the basic legal norms for the protection of intellectual property.PLO 15. To be able to plan and perform independently an innovative task and to formulate conclusions based on its results.PLO 16. To comprehend critically theories, principles, methods in various fields of biology for practical tasks and problems solving.Additionally:PLO 17. To be able to form a system of analysis and interpretation of new results on the structural organization, functioning and formation of groups of microorganisms, based on in-depth knowledge of the disciplines of vocational training.PLO 18. To be able to form a system of knowledge for the interpretation of new data on the structure and function of the immune system and its components at different physiological states, based on in-depth knowledge of the disciplines of professional training. |
| **8 – Resource Support for Program Implementation** |
| **Human Resources** | Scientific and pedagogical staff and researchers who carry out the educational process must have experience of scientific and pedagogical activity over two years and the level of scientific and professional activity, which is evidenced by the implementation of at least four types and results of listed in paragraph 30 of the Licensing Conditions Resolution of the Cabinet of Ministers of December 30, 2015 No 1187, as amended on May 23, 2018.All scientific and pedagogical staff who provide the educational and professional program, by qualification correspond to a profile and a direction of disciplines which are taught, have necessary experience of pedagogical work and experience of practical work.To provide the educational component, leading scientific and pedagogical specialists with scientific degrees and / or academic titles with experience of teaching and / or research work in the field of biology in the relevant profile (specialization), as well as professionals with experience in research / management / innovation / creative works and / or works in the specialty, highly qualified specialists, employees of scientific institutions are involved:1 doctor of science, professor;4 doctors of science, senior researchers;1 doctor of science, associate professor;1 PhD in science, associate professor;1 PhD in science, senior researcher;4 PhD in sciences.In order to improve their professional level, all scientific and pedagogical staff undergo internships once every five years. |
| **Material and Technical Provision** | The university provides logistics:- auditorium fund;- library;- computer classes;- Ukrainian-Korean Center for Information Access;- medical office;- Medical Rehabilitation Center;- Center for Inclusive Learning Technologies;- dining room (coffee shop);- dormitories;- sports grounds, halls and stadium;- availability of ramps;- availability of passenger elevators, etc.Use of laboratory equipment (according to the chosen specialization, in particular: chromatographs, PCR, spectrophotometers, centrifuges, analytical scales, thermostats, microscopes, etc.), the necessary technical equipment, complete with computer and multimedia equipment, applications.Provision of premises for training sessions and control activities in accordance with regulations.Providing multimedia and laboratory equipment for simultaneous use. |
| **Informational, Educational and Methodical Support** | 1. Use of author's methodological works of scientific and pedagogical staff of the University ‘Ukraine’, posted on the site of Internet support of the educational process of the University <https://vo.uu.edu.ua/> and open Internet resources.2. Access to the University Library and reading rooms, which are provided with access to the Internet, domestic and foreign professional periodicals of relevant or related profile, including in electronic form.3. Access to a wireless Internet access point throughout the university.4. Availability of access to databases of scientific periodicals in English of the relevant or related profile. <https://uu.edu.ua/electronni_resursi>, on-line library <http://culonline.com.ua>. 5. Electronic catalog of the library <http://ush.com.ua/kvuulib>. 6. Electronic library <http://ush.com.ua/kvuulib>. 7. Educational and methodical complexes of disciplines <https://vo.uu.edu.ua/>.8. Programs of relevant practices. |
| **9 – Academic Mobility** |
| **National Credit Mobility** | State Higher Educational Institution ‘National Forestry University of Ukraine’;State Higher Educational Institution ‘Uzhhorod National University’; Melitopol Institute of Ecology and Social Technologies of Open International University of Human Development ‘Ukraine’. |
| **International Credit Mobility** | The programs are implemented on the basis of double graduation, i.e. through parallel or consecutive studies at the University ‘Ukraine’ and in a foreign freelance partner. |
| **Training of Foreign Applicants for Higher Education** | Conditions and features in the context of education of foreign citizens:- the second level of higher education - a master's degree in ‘Biology’;- conditions of admission to study under the program are regulated by the Rules of Admission to the University ‘Ukraine’. |

1. **List of Components of Educational and Professional Program**

**and their Logical Sequence**

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| **2.1. EDUCATIONAL PROFESSIONAL PROGRAM****Biology** |

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| ***The second (master's) level*** |
| Code and name of the field of knowledge | 09 Biology |
| Code and name of the specialty | 091 Biology |
| Specialization | ‘Microbiology-Immunology’ |
| Qualification | Master of Biology |
| Code n/a | **Components of the educational program****(academic disciplines, academic papers, practices, qualification work)** | **Amount** | **Form of****the result. control** | **Semesters** |
| **ECTS credits** | **academ. years** |
| **1** | **2** | **3** | **4** | **5** | **6** |
| **І. CYCLE OF GENERAL TRAINING** |
| **1.1. Mandatory Components of the Educational Program** |   |
| MC 1.1 | High School Didactics | 3 | 90 | exam | 1 |
| MC 1.2 | Business English Language | 6 | 180 | credit, exam | 1, 2 |
| MC 1.3 | Research Methodology with the Basics of Modern Experimental Biology | 5 | 150 | exam | 1 |
| MC 1.4 | Computer Simulation in Biology | 5 | 150 | differential credit | 1 |
| **Total Mandatory Competencies for the First Cycle** | **19** | **570** |  |  |
| **1.2. Selective Components of the Educational Program** |
| **Total Selective Competencies** **for the First Cycle** | **6** | **180** |  |
| SC 1.1 | **Disciplines of Free Choice of Students from the General University List of Disciplines** | 3 | 90 | credit | 2 |
| SC 1.2 | 3 | 90 | credit | 2, 3 |
| **Total for the Cycle of General Training** | **25** | **750** |  |  |
| **ІІ. CYCLE OF PROFESSIONAL TRAINING** |
| **2.1. Mandatory Components of the Educational Program** |  |
| MC 2.1 | Bioethics, Biosafety and Labor Protection in Industries using Biological Objects | 3 | 90 | exam | 1 |
| MC 2.2 | Metabolism of Microorganisms and Basics of Industrial Microbiology | 3 | 90 | credit |  1 |
| MC 2.3 | Antibiotics | 3 | 90 | exam | 1 |
| MC 2.4 | Molecular Microbiology | 3 | 90 | exam | 2 |
| MC 2.5 | Immunochemistry and Immunology of Reproduction | 3 | 90 | exam | 3 |
| MC 2.6 | Wastewater Treatment | 3 | 90 | credit, exam, course work | 1,2 |
| MC 2.7 | Molecular Immunology | 3 | 90 | exam | 1 |
| Practice 1 | Pedagogical Practice | 3 | 90 | credit | 2 |
| Practice 2 | Research Practice | 6 | 180 | credit | 2 |
| Practice 3 | Industrial (Undergraduate) Practice | 6 | 180 | credit | 3 |
|   | Preparation of Master's Qualification Work | 9 | 270 |  |  |
|   | **Defense of Master's Qualification Work** |  |  |  | 3 |
|   | **Comprehensive Attestation Exam** | **2** | 60 |  | 3 |
| **Total Mandatory Competencies for the Second Cycle** | **47** | **1410** |  |  |
| **2.2. Selective Components of the Educational Program** |
| **Total Selective Components for the second cycle** | **18** | **540** |  |
| SC 2.1 | Disciplines of free choice of students from the Cycle of Professional Training | 3 | 90 | credit | 3 |
| SC 2.2 | 3 | 90 | credit | 1 |
| SC 2.3 | 3 | 90 | credit | 3 |
| SC 2.4 | 3 | 90 | credit | 2 |
| SC 2.5 | 3 | 90 | credit | 2 |
| SC 2.6 | 3 | 90 | credit | 1 |
| **Total for the Cycle of Professional Training** | **65** | **1950** |   |   |
| **TOTAL NUMBER OF HOURS** |
| **Total Disciplines of Free Choice**  | **24** | **720** |   |
| **TOGETHER:** | **90** | **2700** |   |

Selective components – 24 loans (26.6%), of which:

from the Cycle of general training – 6 credits (25%),

from the Cycle of professional training – 18 credits (75%).

The educational component is chosen by the student from the offered lists:

**According to the Cycle of General Training**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Code n/a** | **Components of the educational program****(academic disciplines, academic papers, practices, qualification work)** | **Amount** | **Form of****the result. control** | **Semesters** |
| **ECTS credits**  | **academ. years** |
| **1** | **2** | **3** | **4** | **5** | **6** |
| SC 1.1 | Philosophical Problems of Modern Science | 3 | 90 | credit | 2 |
| Global Problems of Modern Biology |
| Conflictology |
| SC 1.2 | Corporate Culture | 3 | 90 | credit, credit | 2, 3 |
| Biological Bases of Infectious Processes |
| Databases in Biology |

**According to the Cycle of Professional Training**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Code n/a** | **Components of the educational program****(academic disciplines, academic papers, practices, qualification work)** | **Amount** | **Form of****the result. control** | **Semesters** |
| **ECTS credits** | **academ. years** |
| **1** | **2** | **3** | **4** | **5** | **6** |
| SC 2.1 | Biogeochemical Activity of Microorganisms | 3 | 90 | credit | 3 |
| Technological Bases of Microbiological Productions |
| SC 2.2 | Fundamentals of Medical Microbiology | 3 | 90 | credit | 1 |
| Laboratory Diagnostics |
| SC 2.3 | Microbial Synthesis | 3 | 90 | credit | 3 |
| Technoecology |
| SC 2.4  | Aquatic Microbiology | 3 | 90 | credit | 2 |
| Monitoring of Water Systems |
| SC 2.5 | Human Microecology | 3 | 90 | credit | 2 |
| Clinical Immunology |
| SC 2.6 | Bacterial Genetics | 3 | 90 | credit | 1 |
| Immunogenetics |

**2.2. Structural and Logical Scheme of the Educational Program**

**091 ‘Biology****’**



Bussiness English Language

І semester

ІІ semester

ІІІ semester

High School Didactics

Research Methodology with the Basics of Modern Experimental Biology

Bioethics, Biosafety and Labor Protection in Industries using Biological Objects

Disciplines of free choice of students from the General University List of Disciplines

SC 1.1

Molecular Microbiology

Computer Simulation in Biology

Metabolism of Microorganisms and Basics of Industrial Microbiology

 Antibiotics

Molecular Immunology

Wastewater Treatment

Disciplines of free choice of students from the General University List of Disciplines

SC 1.2

Immunochemistry and Immunology of Reproduction

Pedagogical Practice

Research Practice

Industrial (Undergraduate) Practice

Comprehensive Attestation Exam

Defense of Master's Qualification Work

Disciplines of free choice of students from the Cycle of Professional Training

 SC 2.4

 SC 2.5

Disciplines of free choice of students from the Cycle of Professional Training

 SC 2.1

SC 2.3

SC 2.6

Disciplines of free choice of students from the Cycle of Professional Training SC 2.2

**3. Form of Certification of Applicants for Higher Education**

Attestation of graduation certificates of specialty 091 ‘Biology’ is carried out in the form of a comprehensive attestation examination for the master and presentation of master's qualification work. Certification is carried out openly and publicly.

Certification ends with the issuance of a standard document on the award of a master's degree with the qualification of ‘Master of Biology’.

**3.1. Requirements for Qualification Work**

Qualifying master's thesis of a candidate for higher education master's degree in ‘Biology’ is an independent detailed research, specific conditions,which reflects the integral competence of its author and summarizes the acquired knowledge, skills and abilities in the main disciplines provided by the curriculum. Qualification work involves solving a complex problem and problem in the field of medical and biological sciences, which requires research and / or innovation, is characterized by uncertainty of conditions and requirements.The graduate must certify that he has mastered the necessary knowledge and skills of their practical application in specific conditions.

The state of readiness of the qualifying work of the applicant for a master's degree for defense is determined by the supervisor. A prerequisite for admission to present is the master's successful completion of his curriculum.

Qualification works are allowed for defense, performed by the applicant for a master's degree independently in accordance with the principles of academic integrity. Qualification work is checked for plagiarism. Qualifying work for the week before the presentation is posted on the official website of the University.

Establishment of conformity of the level and volume of knowledge, abilities, competences mastered by applicants of higher education to requirements of standards of higher education occurs through final certification which is carried out openly and publicly at meeting of the examination commission.

**3.2. Requirements for the Attestation Exam**

The program of the complex attestation exam in the specialty ‘Biology’ includes three disciplines from the obligatory component of the educational program of the cycles of general and professional training, which allows to check the level of formation of the relevant skills and abilities:

1. Research Methodology with the Basics of Modern Experimental Biology;
2. Metabolism of Microorganisms and Basics of Industrial Microbiology;
3. Immunochemistry and Immunology of Reproduction.

Approval of the decision of the examination commission on awarding the qualification ‘Master of Biology’ and the issuance of a master's degree based on the results of the final certification of students are announced after the registration of the protocols of the examination commission.

1. **Requirements for the Availability of an Internal Quality Assurance System for Higher Education**

Higher education institutions are primarily responsible for the quality of higher education services.

The University has a system of quality assurance of educational activities and quality of higher education (internal quality assurance system), which provides for the implementation of such procedures and measures:

1) defining the principles and procedures for ensuring the quality of higher education;

2) monitoring and periodic review of educational programs;

3) annual evaluation of applicants for higher education, research and teaching staff of the institution of higher education and regular publication of the results of such evaluations on the official website of the higher education institution, on information stands and in any other way;

4) providing advanced training of pedagogical, scientific and scientific-pedagogical workers;

5) ensuring the availability of the necessary resources for the organization of the educational process, including independent work of students, for each educational program;

6) ensuring the availability of information systems for effective management of the educational process;

7) ensuring publicity of information about educational programs, higher education degrees and qualifications;

8) ensuring an effective system for preventing and detecting academic plagiarism in the scientific works of University staff and applicants for higher education;

9) other procedures and measures described in the Regulations on the System of Quality Assurance of Higher Education, approved by the decision of the Academic Council of the University ‘Ukraine’ of February 22, 2018, protocol No1.

The system of ensuring the quality of educational activities and the quality of higher education (internal quality assurance system) by the higher education institution is assessed by the National Agency for Quality Assurance in Higher Education or its independent institutions for evaluation and quality assurance of higher education for its compliance with the requirements of the system of ensuring the quality of higher education, approved by the National Agency for Quality Assurance in Higher Education, and international standards and recommendations for quality assurance in higher education.

**5. Requirements of Professional Standards**

There are no generally known professional standards.

**6. The List of Normative Documents on which the Educational and Professional Program is Based**

1. Standard of Higher Education in Specialty 091 ‘Biology’ for the Second (Master's) Level of Higher Education. Approved by the Order of the Ministry of Education and Science of Ukraine from 21.11.2019 No1458. URL: <https://mon.gov.ua/storage/app/media/vishcha-osvita/zatverdzeni%20standarty/2019/11/22/2019-11-22-091-M.pdf>;
2. Development of Educational Programs. Guidelines. URL: [http://ihed.org.ua/images/doe/Q4 2016 rozroblennva osv program 2014 tempus-office.pdf](http://ihed.org.ua/images/doe/Q4%202016%20rozroblennva%20osv%20program%202014%20tempus-office.pdf);
3. National Education Glossary: Higher Education. URL: http://ihed.org.ua/images/doc/04 2016 hlossarii Vyshcha osvita 2014 tempus-office.pdf;
4. Development of the Quality Assurance System of Higher Education in Ukraine: Information-Analytical Review. URL: <http://ihed.org.ua/images/>doc/04 2016Rozvitok sisitemi zabesp yakosti VO UA 2015.pdf;
5. European Credit Transfer Savings System: User's Guide. URL: [http://ihed.org.ua/images/doc/Q4 2016 ECTS Users](http://ihed.org.ua/images/doc/Q4_2016_ECTS_Users) Guide-2015 Ukrainian.pdf;
6. EQF-LLL – European Qualifications Framework for Lifelong Leaming. URL: <https://ec.europa.eu/ploteus/sites/eac-eqf/files/brochexp_en.pdf>;
7. QF-EHEA – Qualification Framework of the European Higher Education Area. URL: httр://[www.ehea.info/article-details.aspx?ArticleId=671](http://www.ehea.info/article-details.aspx?ArticleId=671);
8. Rashkevych Y.M. The Bologna Process and a new Paradigm of Higher Education. URL: file:///D:/Users/Dell/Downloads/BolonskyiProcessNewParadigm HE.pdf;
9. Standards and Recommendations for Quality Assurance in the European Higher Education Area (ESG). URL: <http://ihed.org.ua/images/doc/04_2016_ESG_2015.pdf>;
10. International Standard Classification of Education (ISCED 2011): UNESCO Institute for Statistics. URL: [http://www.uis.unesco.org/education/documents/isced-2011- en.pdf](http://www.uis.unesco.org/education/documents/isced-2011-%20en.pdf);
11. ISCED Fields of Education and Training 2013 (ISCED-F 2013): UNESCO Institute for Statistics. URL: <http://www.uis.unesco.org/Education/Documents/isced-fields-of-education-training-2013.pdf>;
12. Qualifications Framework in the European Educational Space. Training manual / Com. V.M. Zakharchenko, M.V. Miiusov, D.H. Parmenova. – Odesa: NU ‘ОМА’, 2017. – 88 p.;
13. European Commission Project ‘Tuning Educational Structures in Europe’. TUNING (to get acquainted with special (professional) competencies and examples of standards). URL: <http://www.unideusto.org/tuningeu/>;
14. Law ‘On Higher Education’. URL: <http://zakon4.rada.gov.ua/laws/show/1556-1>;
15. Resolution of the Cabinet of Ministers of Ukraine ‘On approval of the List of Branches of Knowledge and Specialties for which Higher Education Students are Trained’ dated on April 29, 2015, No266. URL: [http://zakon4.rada.gov.ua/laws/show/266-2015-п](http://zakon4.rada.gov.ua/laws/show/266-2015-%D0%BF);
16. The Act of Coordination of the List of Specialties on which Preparation of Applicants of Higher Education on Degrees (Educational and Qualification Levels) of the Bachelor, the Specialist, the Master and the Licensed Volume is carried out. License: Series АЕ №636819, date of issue 19.06.2015 / Appendix to the Letter of the Ministry of Education and Science dated on November 23, 2015, No1/9-561;
17. Order of the Ministry of Education and Science of Ukraine ‘On the Peculiarities of the Introduction of the List of Fields of Knowledge and Specialties in which Preparation of Applicants of Higher Education is carried out’ from 06.11.2015, No1151. URL: <http://zakon2.rada.gov.ua/laws/show/zl460-15>;
18. National Classifier of Ukraine: ‘Classifier of Professions’ DK 003: 2010. – Kyiv: Sotsinform, 2010. URL: <https://hrliga.com/docs/327_KP.htm>;
19. Regulations on the System of Quality Assurance of Higher Education, approved by the Decision of the Academic Council of the University ‘Ukraine’ of February 22, 2018, protocol No1;
20. Regulations on Educational Programs in the Open International University of Human Development ‘Ukraine’, approved by the decision of the Academic Council of the University ‘Ukraine’ of February 27, 2020, protocol No2. URL: <https://uu.edu.ua/upload/universitet/normativni_documenti/Osnovni_oficiyni_doc_UU/Navch_metod_d-t/Polozh_pro_osvitni_programi.pdf>;
21. Recommendations for the development of educational programs, curricula and working curricula for 2020/2021 based on them, approved by the decision of the Scientific and Methodological Council of the Open International University of Human Development ‘Ukraine’ (Protocol No 3 of 19.02.2020).

**7. Explanatory Note to the Educational and Professional Program**

Educational and professional program 091 ‘Biology’ determines the specifics of the preparation of the second (master's) level of higher education of persons who can start studying under this program, the number of ECTS credits, necessary for the implementation of this program, as well as the expected learning outcomes and competencies that must be mastered by the applicant for the appropriate degree of higher education.

It is based on the competence approach and shares the philosophy of defining the requirements for the specialist, which is the basis of the Bologna process and in the international project of the European Commission ‘Tuning Educational Structures in Europe’ (TUNING).

The order of numbering in the list of general and special competencies is not related to the importance of a particular competence.

**8. Matrix of Correspondence of Program Competencies and**

**Components of the Educational Program**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **MC 1.1** | **MC 1.2** | **MC 1.3** | **MC 1.4** | **SC 1.1** | **SC 1.2** | **MC 2.1** | **MC 2.2** | **MC 2.3** | **MC 2.4** | **MC 2.5** | **MC 2.6** | **MC 2.7** | **PR 1** | **PR 2** | **PR 3** | **SC 2.1** | **SC 2.2** | **SC 2.3** | **SC 2.4** | **SC 2.5** | **SC 2.6** |
| **GC 1** | + | + |  |  | + |  | + |  |  |  | + |  |  |  | + | + | + | + |  | + | + |  |
| **GC 2** | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  | + |  | + | + |
| **GC 3** | + |  | + | + |  | + |  | + | + |  | + |  | + | + | + | + | + | + |  |  | + |  |
| **GC 4** | + |  | + |  | + | + | + | + | + |  |  | + | + |  | + | + |  | + | + |  |  |  |
| **GC 5** |  |  | + | + |  | + | + | + | + |  | + |  | + | + | + | + |  | + |  | + | + |  |
| **GC 6** |  | + | + | + |  | + | + | + | + | + | + | + | + |  | + | + | + | + | + |  | + | + |
| **SC 1** |  |  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  | + | + |
| **SC 2** |  |  | + | + |  |  | + | + |  |  |  |  |  |  |  | + |  | + |  |  |  |  |
| **SC 3** | + |  |  | + | + | + | + | + | + |  | + | + | + | + | + | + | + |  | + | + | + |  |
| **SC 4** |  |  | + | + |  | + |  |  | + |  |  |  | + | + |  | + | + | + |  | + |  |  |
| **SC 5**  |  |  | + | + |  |  | + | + | + | + | + | + |  |  | + | + |  | + | + | + | + | + |
| **SC 6** |  |  | + | + | + | + | + |  |  |  |  |  | + | + |  |  |  |  | + |  |  |  |
| **SC 7** |  |  | + |  |  | + |  |  |  |  |  |  | + |  | + | + |  | + |  | + |  |  |
| **SC 8** | + | + | + |  | + | + |  |  |  |  | + |  | + | + | + | + | + |  | + |  | + |  |
| **SC 9** | + |  | + |  |  |  | + |  |  |  |  |  |  | + |  | + |  |  |  |  |  |  |
| **SC 10** |  |  | + | + |  | + | + | + | + | + |  | + | + | + | + | + |  |  | + |  | + | + |
| **SC 11** |  |  |  |  |  | + | + | + |  |  | + | + | + |  | + | + |  |  | + |  | + |  |
| **SC 12** |  |  |  |  |  | + |  | + | + |  |  |  | + |  | + |  | + |  | + |  |  |  |
| **SC 13** |  |  |  |  |  |  | + | + |  |  | + | + |  |  | + | + |  |  | + |  | + |  |
| **SC 14** |  |  |  |  |  | + |  | + |  |  |  | + | + |  |  |  |  |  | + |  |  |  |
| **SC 15** |  |  |  |  |  | + |  |  | + |  | + |  | + |  | + | + |  |  | + |  | + |  |
| **SC 16** |  |  |  |  |  | + |  |  |  |  | + |  | + |  |  |  |  |  |  | + |  |  |
| **SC 17** |  |  |  |  |  |  | + |  |  |  |  |  |  |  | + | + |  |  |  |  |  |  |
| **SC 18** |  |  |  |  |  |  |  | + | + |  |  | + |  |  | + | + |  |  | + |  |  |  |
| **SC 19** | + | + |  |  | + |  | + |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**9.Matrix of Providing of Program Learning Outcomes (PLO) by
relevant Components of the Educational Program**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **MC 1.1****C 1.1** | **MC 1.2****C 1.2** | **MC 1.3** | **MC 1.4** | **SC 1.1** | **SC 1.2** | **MC 2.1** | **MC 2.2** | **MC 2.3** | **MC 2.4** | **MC 2.5** | **MC 2.6** | **MC 2.7** | **PR 1** | **PR 2** | **PR 3** | **SC 2.1** | **SC 2.2** | **SC 2.3** | **SC 2.4** | **SC 2.5** | **SC 2.6** |
| **PLO 1** |  | + |  |  |  |  |  |  |  |  | + |  |  | + | + | + | + |  | + |  | + |  |
| **PLO 2** | + | + | + | + | + |  | + | + | + | + | + | + |  | + | + | + | + |  | + |  | + | + |
| **PLO 3** |  |  |  |  | + |  | + |  |  |  | + |  |  | + | + |  |  |  |  | + | + |  |
| **PLO 4** |  |  | + | + |  |  |  | + | + |  |  | + |  |  | + | + | + | + |  |  |  |  |
| **PLO 5** |  |  | + | + | + | + | + | + |  |  |  | + | + | + |  |  |  |  | + |  |  |  |
| **PLO 6** |  |  |  | + |  |  |  |  | + | + |  |  |  |  |  | + |  | + | + | + |  | + |
| **PLO 7** |  |  |  |  |  | + |  | + |  | + |  |  | + |  | + | + |  |  |  |  | + | + |
| **PLO 8** |  |  | + | + |  |  |  |  | + |  |  | + |  |  |  | + |  |  |  |  |  |  |
| **PLO 9** |  |  | + | + |  |  |  | + | + |  | + | + |  |  |  | + |  | + | + |  | + |  |
| **PLO 10** |  |  | + |  | + |  |  |  |  |  | + | + |  |  | + | + | + |  |  |  | + |  |
| **PLO 11** |  |  |  | + |  |  |  |  |  |  | + | + |  |  |  | + |  |  |  |  | + |  |
| **PLO 12** |  |  |  | + |  |  |  | + |  |  |  | + |  |  | + | + | + |  |  |  |  |  |
| **PLO 13** |  |  | + |  |  |  | + |  | + |  |  | + |  |  | + | + |  | + |  |  |  |  |
| **PLO 14** | + |  | + |  | + |  |  |  |  |  |  | + |  |  |  | + |  |  |  | + |  |  |
| **PLO 15** |  |  |  | + |  |  |  |  |  |  |  | + |  |  | + | + |  |  | + |  |  |  |
| **PLO 16** |  |  |  | + | + |  | + |  | + |  |  | + |  |  |  |  |  |  |  |  |  |  |
| **PLO 17** |  |  |  |  | + | + | + | + | + |  |  | + |  |  | + | + | + |  | + |  |  |  |
| **PLO 18** |  | + |  |  |  |  |  |  |  |  | + |  | + | + |  |  |  | + |  |  | + |  |

1. Main stakeholders:

• entrants, students, graduates;

• teachers;

• employers;

• accreditation institutions., [↑](#footnote-ref-1)