

**NATIONAL UNIVERSITY OF LIFE  
AND ENVIRONMENTAL SCIENCES OF UKRAINE**

**MASTER CURRICULA  
AND TRAINING PROGRAMS**

**2022-2023  
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## HISTORICAL BRIEF

The National University of Life and Environmental Sciences of Ukraine (NULES of Ukraine) - it is the university of the IV accreditation level with the status of self-governing (autonomous) university.

Since 2014, NULES of Ukraine is headed by Rector Stanislav Nikolaenko, corresponding member of the National academy of pedagogical sciences of Ukraine, doctor of pedagogy, professor.

Its origin dates back from the agricultural department of Kiev Polytechnic Institute and the Warsaw forestry school (Poland).

In January 1898, a special Committee was formed in order to organise the educational institution. D. Mendeleev took an active part in opening this institution. He was a member of the Commission on Statute elaboration. The Commission, organized under the Ministry of Finance, developed regulations on organization of Kiev Polytechnic Institute.

According to the regulations published 8 June 1898 and signed by Emperor Nicholas II with the endorsed resolution "Be it so enacted...", "Emperor Alexander II Kiev Polytechnic Institute (KPI) is a higher educational institution that aims to provide students with technical education, it has four departments: chemical, mechanical, engineering and agricultural".

On August 31, 1898, KPI was solemnly opened in Kiev, and on September 1, the first students began their studies.

The agricultural Department of the Kiev Polytechnic Institute was transformed in 1918 into agricultural (agronomy) faculty, and in 1922 into Kiev agricultural Institute, which in 1923 became an independent institution of higher education.

The first dean of the agricultural department was M.P. Chyrvynskyi, Master of Agriculture, State Councilor, Honorary Professor and Head of zoo breeding technologies department. His achievements contributed to the national science treasury. The honorary fellow and lecturer of the agricultural department was K.A. Timiriaziev, professor emeritus of the Imperial Moscow University.

The first 32 scientists-agronomists graduated in 1903. D.I. Mendeleev, a famous scientist and chemist, an honorary fellow of the popular Kiev society of naturalists was the Head of the State Examination Board. He appreciated the high level of graduates' knowledge.

The first educational buildings in Golosiievo were designed in the style of Ukrainian Baroque by the architect D.M. Diachenko in 1926-1929.

In 1926, Kyiv Agricultural Institute was the leading institution of agricultural science and agronomic education in the central part of Ukraine. The People's Commissariat of Education, as official documents certify, planned to transform KAI into the higher agricultural school of USSR – Ukrainian Agricultural Academy. Subjective and objective reasons prevented the realization of this project. This happened only in the 1950s.

In the first half of the 1930s a number of independent institutions operated on the bases of KAI. However, in the mid 1930s the institution regained its name and structure.

During World War II KAI evacuated to Alma-Ata and functioned as part of Kazakh Agricultural Institute. After returning from the evacuation, the higher education institution resumed its work in 1944. There was a slogan at that time "If you want to study – rebuild your institute."

In 1948 on the occasion of its 50th anniversary, the institute was rewarded with the Order of the Red Banner for outstanding achievements in teaching and research work.

Kyiv Forestry Institute began its history from the Warsaw forestry school (organized in 1816), which affiliated with Institute of Agriculture in Marimont (Poland, 1840), and the latter was reorganized into the Institute of Agriculture and Forestry. In 1862, it transferred

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to Novo-Alexandriya (now – Pulawy, Poland). At the beginning of World War I (1914), a number of faculties of Novo-Alexandriya Institute of Agriculture and Forestry incorporated into Kharkiv Institute of Agriculture and Forestry (since 1921). In 1930, Forestry Faculty of Kharkiv Agricultural Institute moved to Kyiv and affiliated with Forestry engineering faculty of Kyiv Agricultural Institute to become the Ukrainian Forestry Technical Institute, and the same year it reorganized into Kyiv Forestry Institute.

In 1954 Kyiv Agricultural Institute and Kyiv Forestry Institute merged into the institution "Ukrainian Agricultural Academy of the Order of the Red Banner" (UAA). The academician P.D. Pshenychnyi became its first rector.

In the 1950s UAA was not only the major staff-training center for agriculture in Ukraine, but also the center of its scientific support. From 1956 to 1962, the Ukrainian Agricultural Academy became an educational department of the Ukrainian Academy of Sciences (UAS). This period became one of the most fruitful in the history of the institution, since there was a real possibility of integration of education and research activities, which made the institution famous in the former USSR. This was the prototype of large education and research universities functioning in highly developed countries of the world.

By the willful decision of the Government, the Ukrainian Academy of Agricultural Sciences liquidated due to consistent upholding of the strategy of agricultural development by the Presidium of the Ukrainian AAS, which did not coincide with the official opinion. The research institutes reassigned to the All-Union Academy of Agricultural Sciences named after Lenin and Ministry of Agriculture of USSR.

In 1957 Kyiv Veterinary Institute was joined to UAS, the Institute began its work as a veterinary faculty of Kiev Polytechnic Institute (1920), and since 1921 it functioned as an independent Kyiv veterinary and zoo technological Institute. Kyiv veterinary institute has functioned since 1930.

The 1960-80s were the period of developing international relations. During this time, over two thousand foreigners from more than 100 countries of Asia, Europe, Africa, Indochina and Latin America graduated from the academy.

The university developed its research activities, founded world famous schools led by famous scientists. The teaching staff significantly improved forms and methods of training specialists for agriculture and carried out research on current economic problems in the agricultural sector of Ukraine.

In 1982, the Ukrainian Agricultural Academy established Vinnytsia affiliate branch, which in 1991 became an independent institute (now – Vinnytsia State Agrarian University).

From 1962 to 1992, the educational institution was functioning as an autonomous Ukrainian Agricultural Academy, subordinated to the Ministry of Agriculture of the USSR, and later – the USSR.

Acquiring the experience of highly developed countries in the field of higher education, active collaboration with leading agricultural educational institutions, participation in the reform of higher education in Ukraine in the framework of the Bologna process have led to the qualitative changes in the structure and functioning of the institution, resulting in the change of its status and title.

In August 1992, the Ukrainian Agricultural Academy transformed into the Ukrainian State Agrarian University and got the status of National University according to the resolution of the Verkhovna Rada of Ukraine No. 158 from July 29, 1994. Since that time, it existed as the National Agrarian University and according to the above resolution of the Verkhovna Rada of Ukraine and the resolution of the Cabinet of Ministers of Ukraine No. 387 from June 1, 1995 was subordinated to Cabinet of Ministers of Ukraine.

The structure of the university included a lot of education and research institutions and production subdivisions as entities that later were reorganized into separated subdivisions.

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Since 1936 the University has incorporated Boyarka Forest Research Station, since 1957 – training and research farm "Vorzel", since 1966 – Agronomic Research Station (Kyiv region), since 1972 – Velykosnitynka training and research farm named after O.V. Muzychenko.

In 1996, according to the resolution of the Cabinet of Ministers of Ukraine from April 23, 1996 № 448, Nizhyn Agricultural College (Chernihiv region) joined National Agraricultural University.

According to the Resolution of the Cabinet of Ministers of Ukraine from 29 May 1997 № 526, Berezhany Agricultural College (Ternopil region), Zalishchyky (Ternopil region) and Boyarka (Kiev region) agricultural colleges, Nemishaivo agricultural college and Irpin Economic College (Kiev region) joined the NAU.

Eventually, according to the results of accreditation, Irpin, Nemishayevo, Zalishchyky and Boyarka Technical Schools received the status of colleges.

According to the Resolutions of the Cabinet of Ministers of Ukraine from 6 May 2001 No 434 and from May 16, 2001 No 508, Berezhany and Nizhyn agrotechnical institutes were organized. According to the order of Cabinet of Ministers of Ukraine from August 8, 2001, № 327 of the Ministry of Agrarian Policy of Ukraine the Institute of post-diploma education of managers and specialists of AIC was transferred to the National Agrarian University. Since 2003, the Ukrainian laboratory of quality and safety of AIC products was organized in the National Agrarian University.

In 2004 the Ukrainian Research Institute of Agricultural Radiology joined the National Agrarian University.

In 2005 Bobrovytsia College of Economics and Management named after O. Mainova (the present name of the college) joined the National Agrarian University. In 2007 Mukacheve Agricultural College joined the University.

Since 2016, "Rivne College" has been functioning as the separated subdivision of NULES of Ukraine.

In 2015, the university organised interdepartmental laboratories on the basis of Tarashcha agrotechnical college, Malyn and Lubny Forestry Colleges, SS of NULES of Ukraine - Mukacheve Agrarian College, Bobrovytsia College of Economics and Management University named after O. Mainova, and Berezhany Agrotechnical Institute.

In the field of international cooperation the university signed agreements on collaboration with a lot of educational and research institutions worldwide.

To expand the educational, research and innovation activities of the National Agrarian University and to satisfy the needs of agricultural, environmental and other industries, as well as to adapt these activities to the requirements of international organizations of research universities, National Agrarian University was renamed into the National University of Life and Environmental Sciences of Ukraine (NULES of Ukraine) by the Resolution of the Cabinet of Ministers of Ukraine № 945 from October 30, 2008, and in № 76 from February, 2010 it received the status of self-governing (autonomous) research national university.

The result of the university reform is clearly outlined in the Development Program of NULES of Ukraine for 2021-2025 "Holosiivska Initiative 2020 - 2025". The prospects for its implementation are a combination of educational, research, innovation, information and consulting and training and production activities. Thus, in the field of its achievements, the university is a vivid example of an educational institution of the XXI century and one of the best institutions of higher education in Ukraine.

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## MASTER TRAINING PROGRAMS AT NULES OF UKRAINE

The National University of Life and Environmental Sciences of Ukraine has been providing master training programs since 1996.

The curricula and programs of Master's Degree training are compiled in accordance with requirements of Law of Ukraine "About higher education". Their adaptation and conformity meet the requirements of U.S. and European systems of higher agricultural education.

The National University of Life and Environmental Sciences of Ukraine provides training for educational level "Master" in 41 specialties covering 63 educational programs (63 educational and professional та 7 educational and research) (table 1)

**Table 1.** Specialties and educational programs in Master training at NULES

Structural subdivision (ERI, faculty)	Specialty	Educational programs
<b>Educational and professional program</b>		
ERI of Energetics, Automatics and Energy Saving	Automation and Computer Integrated Technologies	✓ Automation and Computer Integrated Technologies
	Power Engineering, Electrical Engineering and Electrical Mechanics	✓ Power Engineering, Electrical Engineering and Electrical Mechanics
ERI of Forestry and Garden-Park Management	Forestry	✓ Forestry
	Woodworking and Furniture Technologies	✓ Woodworking and Furniture Technologies
	Park and Gardening Management	✓ Park and Gardening Management
ERI continuing education and tourism	Management	✓ Extension service (Part-time)
		✓ Management of innovative activity (Part-time)
		✓ Management of tourist and hotel and restaurant business (Part-time)
	Tourism	✓ International tourism business
	Public Management and Administration	✓ Public Management and Administration (Part-time)
Agrobiology	Agronomy	✓ Agronomy
		✓ Agrochemistry and Soil Science
		✓ Selection and genetics of agricultural crops
		✓ Agrohimservice in precision agricultural production
	Horticulture and Viticulture	✓ Horticulture and Viticulture
Humanitarian Pedagogical	Management	✓ Management of educational institution*
		✓ Management of Human Resources
	Education and Educational Science	✓ Pedagogy of higher school
		✓ Information and communication technologies in education
	Social Work	✓ Social Work
		✓ Socio-psychological rehabilitation
	Philology (german languages and literature) (including translation), the first - English)	✓ English and other foreign language
	Philology (german languages and literature) (including translation), the first - German)	✓ German and other foreign language
	Psychology	✓ Psychology



**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Structural subdivision (ERI, faculty)</b>	<b>Specialty</b>	<b>Educational programs</b>
	Journalism	✓ Journalism
	International relations, public communications and regional studies	✓ International relations, public communications and regional studies
Economic	Economy	✓ Economics of enterprise ✓ Applied Economics (Part-time)
	Accounting and Taxation	✓ Accounting and audit
	Entrepreneurship, Trade and Exchange Activities	✓ Entrepreneurship, Trade and Exchange Activities
	Finance, Banking and Insurance	✓ Finance and credit
	Agricultural Engineering	✓ Agricultural Engineering
Mechanics - Technology	Automobile Transport	✓ Automobile Transport
	Transport Technologies (by Automobile Transport)	✓ Transport Technologies (by Automobile Transport)
		✓ Administrative management ✓ Management of foreign economic activity ✓ Management of organization and administration ✓ Management of investment activity and international projects
Agrarian Management	Marketing	✓ Marketing
Veterinary Medicine	Veterinary Medicine	✓ Veterinary Medicine
	Veterinary hygiene, sanitary and expertise	✓ Veterinary hygiene, sanitary and expertise
Plant Protection, Biotechnology and Ecology	Biotechnology and Bioengineering	✓ Environmental biotechnology and bioenergetics
	Ecology	✓ Ecological control and audit ✓ Ecology and environmental protection
	Plant Protection and Plant Quarantine	✓ Plant Protection ✓ Quarantine of Plants
Land Management	Geodesy and Land Management	✓ Geodesy and Land Management
Information Technology	Economy	✓ Economic cybernetics
	Software Engineering	✓ Information Systems Software
	Computer Science	✓ Information managing systems and technologies ✓ Computer ecological and economic monitoring
	Computer Engineering	✓ Computer systems and networks
Construction and Design	Construction and Civil Engineering	✓ Construction and Civil Engineering
	Industrial Mechanical Engineering	✓ Machinery and equipment of agricultural production ✓ Equipment of forest complex ✓ Technical service of machines and equipment of agricultural production
Livestock Science and Water Bioresources	Water Bioresources and Aquaculture	✓ Water Bioresources and Aquaculture
	Technology of Production and Processing of Livestock Products	✓ Technology of Production and Processing of Livestock Products
Alimentary Technologies and Managing of Quality of Productes of ASE	Metrology and Information and Measurement Technique	✓ Quality, Standardization and Certification
	Food Technologies	✓ Technologies of storage, preserving and reprocessing of meat ✓ Technologies of storage and reprocessing of aquatic bioresources

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Structural subdivision (ERI, faculty)</b>	<b>Specialty</b>	<b>Educational programs</b>
		✓ Nutritionology (Part-time)
Law	Law	✓ Law
<b>Educational and research program</b>		
Construction and Design	Industrial Mechanical Engineering	✓ Machinery and equipment of agricultural production
	Construction and Civil Engineering	✓ Construction and Civil Engineering
ERI of Energetics, Automatics and Energy Saving	Automation and Computer Integrated Technologies	✓ Automation and Computer Integrated Technologies
	Power Engineering, Electrical Engineering and Electrical Mechanics	✓ Power Engineering, Electrical Engineering and Electrical Mechanics
Mechanics - Technology	Agricultural Engineering	✓ Agricultural Engineering
Alimentary Technologies and Managing of Quality of Productes of ASE	Food Technologies	✓ Nutritionology
Agrarian Management	Management	✓ Management of investment activity and international projects

The peculiarities of Master training at NULES of Ukraine are characterized by close relationship of the program contents with the sphere of future employment of graduates.

Master training at NULES of Ukraine is carried out according to:

- programs:
  - educational and professional;
  - educational and research;
- specialties "Public Management and Administration" in educational program "Public Management and Administration".

Individuals who have studied and intend to continue training in the chosen specialty for deeper educational program are enrolled on educational and professional program (1,5 years of study (90 ECTS)). These programs are implemented to ensure the science-intensive production sector with highly qualified specialists who possess the innovative knowledge and are able to apply it into modern high technologies.

The training of Masters on the educational and research program (2 years of study (120 ECTS)) is provided only by the departments of the University, which are entitled to train postgraduate students, have sufficient funding and considerable progress in research activities. Applicants are required to have a good command of at least one foreign language. The educational and research program includes an obligatory research (scientific) component, no less than 30 per cent).

Master training on this program includes conducting further research activity according to the chosen specialty to obtain PhD during postgraduate study or at a research institution.

At NULES of Ukraine the **educational program "Public Management and Administration"**, is popular. It focuses on training specialists for public authorities and local governments, able to effectively develop and implement their knowledge in the field of state regulation on the basis of current legislation and information technology.

***The structure of the content of educational programs for Master's degree in NULES of Ukraine***

Educational (educational-professional or educational-scientific) program is a system of educational components at the appropriate level of higher education within the specialty. It determines the requirements for the level of education of individuals who can apply for

this program, the list of academic disciplines and logical sequence of their study, the quantity of ECTS required to complete this program, as well as the expected learning outcomes (competences) to be acquired by an applicant for the relevant higher education degree.

The content of educational programs in NULES of Ukraine is determined by:

- requirements for professional activity of specialists;
- direction and professional specialization of previously acquired education;
- specific features of master's training.

The structure of the content of educational programs for Master's degree in NULES of Ukraine includes three blocks of disciplines (Fig. 1).

The list, scope and forms of certification of compulsory disciplines within the corresponding specialty (educational program) (block 1) are defined by higher education standards, according to the requirements of the Ministry of Education and Science of Ukraine. The study of these disciplines provides the basis of the specialty (educational program), forms a master's degree.

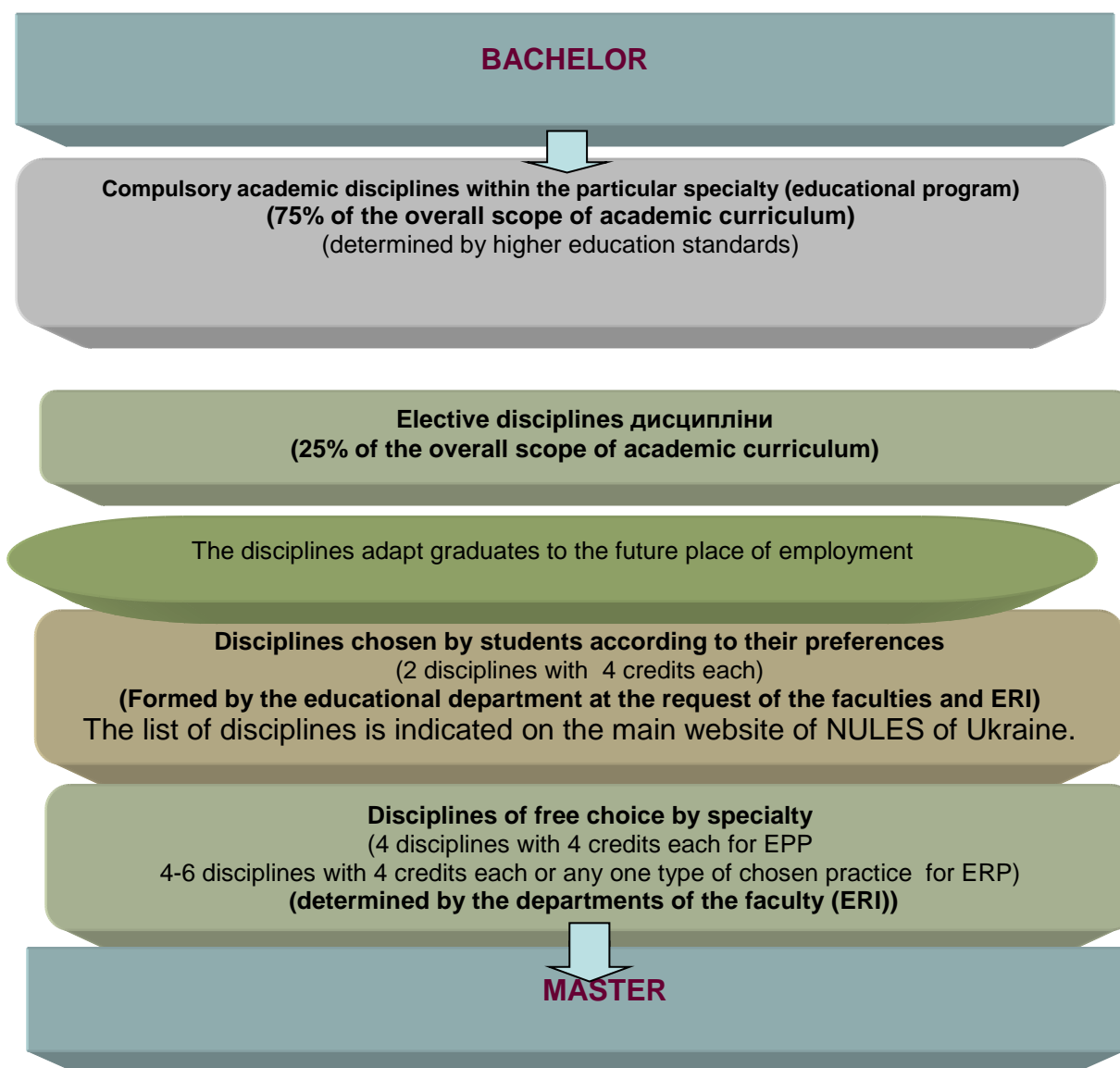


Fig. 1. The structure of the content of educational programs for Master's degree in NULES of Ukraine

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The study of the disciplines of the elective part determines the basis of the educational program within the relevant specialty. The list, forms of study and certification of elective courses are determined by working groups formed by order of the rector of the university and recommended by the academic councils of faculties (ERI), then they are approved by the educational and methodological council of the university and after that by the academic council of the university.

The list, forms of study and certification of elective disciplines chosen by students according to their preferences (block 2) are formed by the educational department at the request of the faculties and educational and research institutes. The list of elective disciplines with their annotations is indicated on the main website of NULES of Ukraine. These disciplines are included into the educational programs of the second semester and contribute to the development of soft skills.

The list, forms of study and certification of elective disciplines of free choice in the specialty (block 3) is determined by the departments of the faculty (ERI). They are included in the curriculum depending on the student's choice and are studied mainly during the second year. These disciplines enable graduates to successfully write master's thesis and adapt to the future place of employment.

Professional training of students, including research on the topic of master's thesis, begins from the first semester of their master's degree. Much of the training is intended for independent work.

### ***The main forms of implementation of educational process at NULES of Ukraine***

The educational process at NULES of Ukraine is realized through various forms including in-class activities, practical training, independent study and control (Fig. 2).

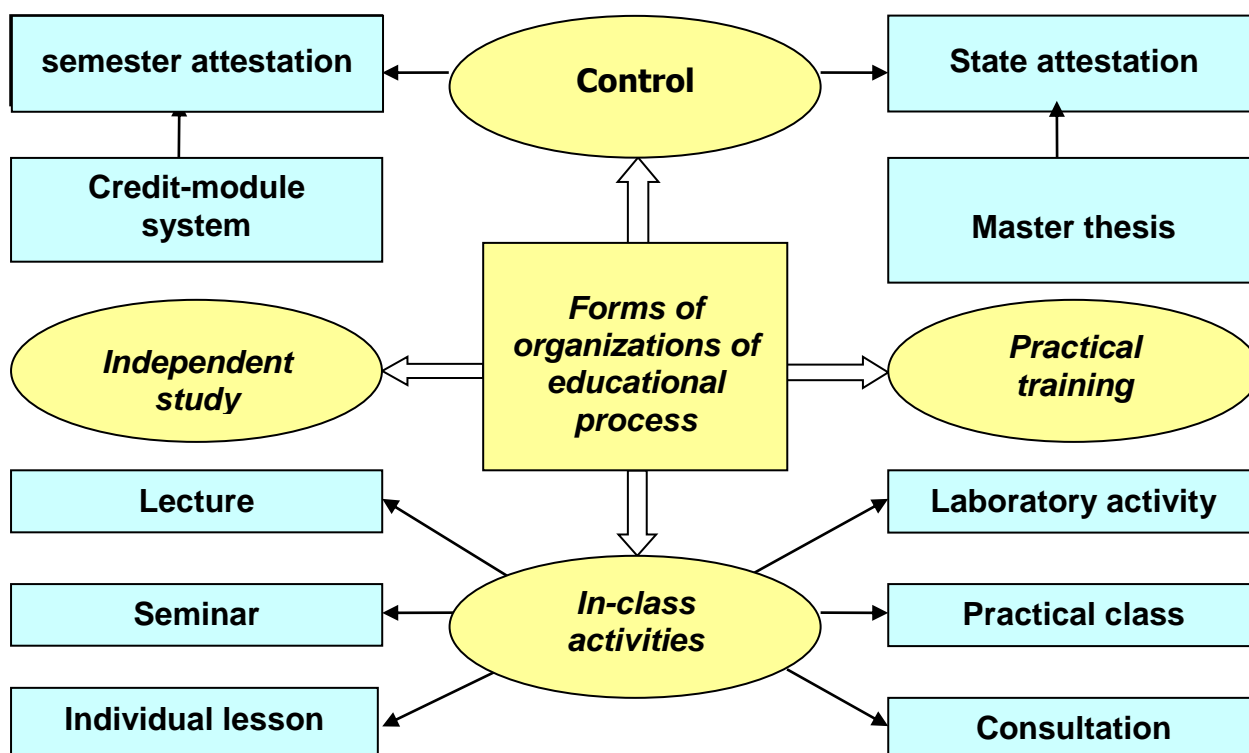


Fig. 2. The main form of implementation of educational process at NULES of Ukraine

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The in-class activities are conducted in the form of lectures, practical classes, seminars, laboratory activities and individual lessons, including the use of distance learning methods.

Independent study is the main way to master knowledge and skills apart from regular classes. At NULES of Ukraine it is provided by the system of teaching tools, including textbooks, teaching and methodological aids, course books, abstracts of lectures, practical classes, e-courses of disciplines on educational information portal on Moodle distance learning platform. This work is conducted according to schedules. It guarantees the student's individual access to the necessary didactic materials. At the beginning of the current semester the students are informed about the schedule.

The teaching staff of appropriate departments is always available for consultation when students use complex equipment and information access systems while studying independently.

Special attention is paid to students' practical training system aimed at generalization of the theoretical and practical knowledge and acquisition of professional skills. It is conducted in the form of laboratory and practical classes, training and production practices that can be conducted at university's centers of practical training:

- 2 research stations – "Agronomic Research Station" SD of the NULES of Ukraine and "Boyarka Forestry Research Station" SD of the NULES of Ukraine (Kyiv region);
- 5 training and research farms (TRF) – Velykosnitynka Training and Research Farm named after Muzychenko, SS of the NULES of Ukraine "Vorzel", SS of NULESU "Nemishaievo Agro-Technical College"\*(Kyiv region), SS of NULESU "Zalischyky Agricultural College named after Khraplyvyi", SS of NULESU "Nizhyn Agro-Technical Institute" (Chernihiv Region);
- Special facilities for practical training of regional higher educational institutions of NULES of Ukraine I-II accreditation levels;
- Botanical garden of NULES of Ukraine.

The university farms are located in different soil and climatic zones of Ukraine - woodlands, forest-steppe, steppe. The peculiarity of practical training bases of the university is that they have relevant departments and branches as well as over 30 educational, industrial, scientific and research laboratories where students have laboratory and practical classes, training and production practices etc.

Forms of control of students' progress are credits which are done in the form of tests and exams in written form according to the examination cards which include various questions and tests of different types. After conducting the written examination and according to the results of answers to the exam questions, the student is interviewed by two lecturers, who conducted the final attestation. They determine the student's final grade.

Students take regular attestation during the course at department meetings, where they reports on the implementation of the individual plan on the whole and master's thesis in particular (Fig. 3).

Defence of Master's thesis is the final stage of student training and the form of graduates' state attestation. Attestation of applicants for higher education, that is, conformity of the level and amount of applicant's knowledge, skills and other competences to the requirements of higher education, is carried out by the board (EB) which makes the decision on the award of the relevant level higher education and qualification to a graduate.

Training of graduate students at the University is carried out by full-time and part-time (distance) forms. The main form of training masters at NULES of Ukraine – is full-time, for individuals who have already chosen the place of work – part-time form.

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Part-time form, as a rule, has a longer duration compared to full-time (not more than by 25 %) and requires students to do a great deal of tasks independently, using appropriate teaching materials and means of distance education.

At NULES of Ukraine, educational and information portal [moodle.nubip.edu.ua](http://moodle.nubip.edu.ua) functions on the basis of the platform Moodle in order to provide information and methodological support of disciplines. It hosts e-learning courses in the respective disciplines and services of on-line communications (Skype, Google Apps, social networks). All this makes it possible to use distance learning technologies in the academic process, which raises the learning process to the international standards.

The process of part-time (distance) education is organized during a calendar year examination sessions. During these sessions as well as in the intersessional period, all forms of the educational activities are carried out: in-class activities, independent study, practical training and control.

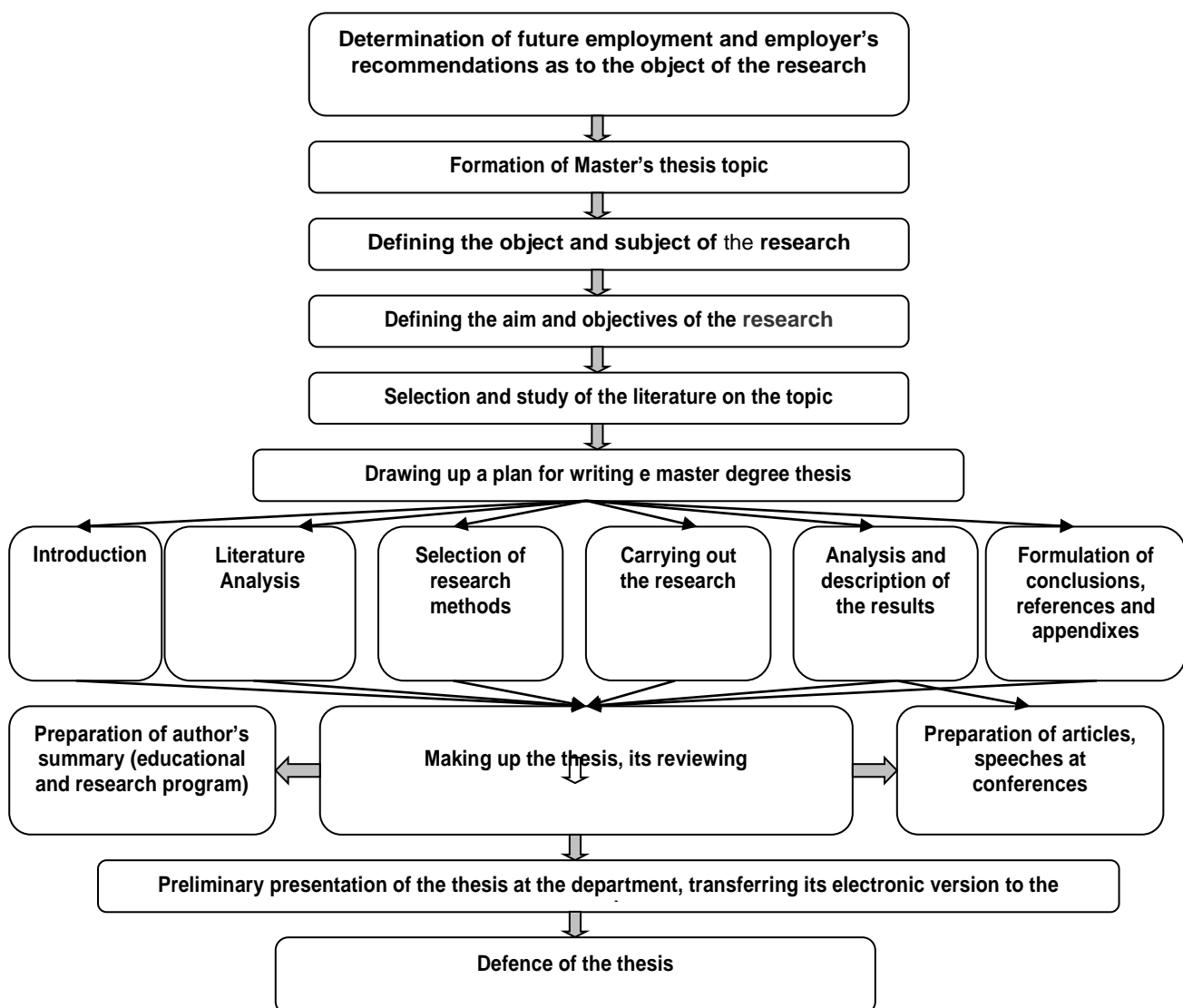


Fig. 3. Stages of writing Master thesis

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## SCIENTIFIC LIBRARY

Scientific Library is a modern, scientific, cultural, educational, information center that meets the users' needs of getting the latest information,.

The main task of the scientific library of University is to develop library collections to meet the needs of users in various specializations. Diversified Library collection numbers more than one million copies of national and foreign books, including rare books (since 1779), abstracts of theses (since 1950), theses (since 1946), The Library annually subscribes to more than 100 titles of journals and more than 50 different newspapers.

Information and bibliographic desk (electronic, alphabetical, systematic catalogs and card indexes) facilitates wide and overall use of the library collection. The main technological processes have been automated in scientific library. Since 2012 the scientific library has begun to give books to users in automated mode. Workplaces of library employees are equipped with specialized scanners and printers, with make it possible to attach each book to a specific user on the basis of bar-coding.

To familiarize freshmen with the library according to the program "Information culture" the classes how to use library information search facilities (both traditional and electronic catalog) are organized by the library staff. The scientific library organizes information mass events devoted to current university issues.

The information about the scientific library, including its resources can be found on the library site: <https://nubip.edu.ua/structure/library>

Since 2006 the Scientific Library has become a depository library of FAO (FAO - Food and Agricultural Organization) in Ukraine. The Depository fund contains 1100 documents in English, including analytical materials, statistical compilations, reports compiled in the electronic catalog of the scientific library. Some materials come with CD-ROMs. Literature of FAO is stored in the central library.

One of the priority tasks of the library is to provide access to students, postgraduate students and the staff of the University to international electronic resources and data bases such as:

- SCOPUS, which is an abstract and scientific base of peer-reviewed literature and proven web sources. The search engine uses software for tracking, analyzing and visualizing research, SCOPUS indexes about 22,000 titles of various publications (including 55 Ukrainian) of more than 5,000 publishing houses;

- Web of Science (WoS), which is an abstract database of scientific publications, offering an access to bibliographic data of scientific articles of prestigious periodicals, books and materials of scientific conferences, indicating the real citation of these materials. Thus, the user is able to immediately evaluate the relevance of any publication and its impact on the scientific community;

- EBSCO is one of the world's largest suppliers of electronic and printed journals, containing over 6,000 electronic versions of well-known magazines, newspapers, newsletters, about 1300 brochures, encyclopedias, reference books and abstracts, most of which are full-text. EBSCO provides the search of full-text, peer-reviewed, specialized materials from social, economic, medical, technical and other fields at 60 search requests.

At the disposal of users there is also an e-library that contains the full texts of academic and scientific publications of scientists of the University, namely more than 1400 educational textbooks, about 612 monographs, more than 3440 educational materials (guidelines for laboratory, practical and seminar work, lectures course notes etc.) and over 300 dissertation abstracts. The e-Library of NUBiP of Ukraine is available through the local university network.

The square of the library is 2844 m<sup>2</sup>. Scientific library users are serviced in 8 lending libraries and 8 reading rooms for 580 seats. The structure of the scientific library consists

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of 5 branches with the funds of more than 180 thousand documents of educational, scientific, reference books and periodicals. These branches of the library provide subscriptions and reading rooms equipped with modern computer techniques. In addition, there are two subscription services to all categories of readers of scientific literature and fiction. Users have free access to the Internet both in the central library and its branches.

If there is no literature a reader needs in the library, it is possible to order it on interlibrary subscription (ILS) and by email (library@nubip.edu.ua). Such an extensive library system makes it possible to serve over 40 000 users per year by all structural divisions. More than one million copies of books a year are given to users.

The research library is equipped with latest computer technology and equipment: 50 PCs, 13 printers, 2 scanners, a powerful database server. The premises of the Central library and its branches have modern interior and comfortable environment for users and staff of the University.

The structure of the scientific library consists of 5 departments and 5 branches.

**The department of book acquisition, scientific processing of documents and catalogue organization.** The main task of the department is full, theoretically substantiated acquisition of library book collection to support training and educational process and research activity of the University.

The department of book acquisition, scientific processing of documents and catalogues organization provides:

- ordering the purchase of necessary literature for university departments in automated manner;
- control the just-in-time delivery of ordered literature to the scientific library;
- transferring received literature to the library affiliates and departments for proper storage;
- subscription of Ukrainian and Russian periodicals;
- individual and total accounting of documents transferred to the library in traditional and electronic forms (applying bar code technology);
- daily databases filling of electronic library catalog with bibliographic descriptions of new literature acquisitions;
- organization and updating of systematic, alphabetic and electronic catalogs;
- scientific researches collections exchange with 26 higher educational agrarian institutions of Ukraine.

**Information and bibliography department.** The main task of the department is to quickly and fully meet the information needs of scientific library users. The department provides such services:

- Library dissertations collection (over 5,000 units);
- Master Thesis collection (500 items);
- research papers of 26 higher educational agrarian institutions of Ukraine;
- Ukrainian and Russian periodicals.

Information and Bibliography Department:

- compiles indexes and lists of literature according to the topics of research papers and to support the academic process at the University;
- encrypts scholars and students' research papers according to the tables of the Universal Decimal Classification (UDC);
- daily filling of electronic library catalog with analytic descriptions of articles from periodicals, collections of research papers, and bibliographies prepared by the department staff.

Information and bibliographic department organizes and conducts:

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- "Department days", "Master days", "Information days" for information service of users;
- theme book exhibitions devoted to key issues, as well as jubilee exhibitions of outstanding University scientists;
- "Information culture" classes for first year students, postgraduates and masters to make them familiar with resources (both external and internal), access to which is provided by the library;

***The department of information technologies and computers support.*** The main task of the department is to support functioning of the automated library and information system "IRBIS-64" and maintain electronic information resources of the library. The department provides such services:

- Library electronic catalogue (contains more than 120,000 of bibliographic descriptions of books, periodicals, authors' abstracts, dissertations and other documents available in the library);
- an electronic library which contains the full texts of educational and scientific publications of university scientists;
- collection of electronic library resources (including portal - AGORA, international databases EBSCO, BioOne, etc.);
- Free Internet access and Wi-Fi.

***The department of information technologies and computers support provides:***

- support Website of scientific library (<https://nubip.edu.ua/structure/library>);
- Filling the university e-library, library users database to provide service in automatic mode;
- digitization of collection of rare and valuable books to place them in the database of electronic catalog;
- computer maintenance service.

***Department of academic literature.*** The total books collection of the department is 61145 items (books, periodicals, instructions for laboratory and practical works).

Users are provided with academic literature, reading room for 140 seats, free Internet and Wi-Fi access.

The department has academic and scientific literature in:

- Agronomy;
- Plant Protection;
- Plant Biotechnology;
- Ecology;
- Fish farming;
- Feeding and breeding;
- Genetics of plants and animals;
- Technology of production and processing of livestock products;
- Quality management of agricultural products;
- Pedagogy;
- Psychology;
- Culture studies.

***The department of scientific literature and fiction.*** The main task of the department is to provide users with scientific literature and fiction. Book collection of the department is more than 450,000 items, including:

- 400000 copies of scientific literature;
- 58000 copies of fiction;
- 9500 copies of foreign literature;

Users are provided with:

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– Ordering of an unavailable book in the library collection according to interlibrary subscription (ILS) from the largest library of the country - the National Library of Ukraine named after V.I. Vernadskyi;

– The collection of rare, valuable documents contain more than 3500 units. The real treasures of the fund are rare and unique books such as: "The News of Petrovsk Arable Farming and Forest Academy" (1779), "Russian Chronicle by Nikon list" (p. 3, 6, 7, 1786-1791), "Archive of Veterinary Sciences ", "Forest Journal "(1873), etc.;

– Depository library of FAO (FAO - Food and Agricultural Organization), which stores more than 1100 documents in English and Russian including analytical materials, collected statistic data, reports.

***Branch of scientific library in educational building № 11.*** The total book collection of the branch is 52425 items (books, periodicals, instructions for laboratory and practical works).

Users are provided with academic literature, reading room for 83 seats, free Internet and Wi-Fi access.

The department offers academic and scientific literature in:

- Power engineering;
- Heat engineering;
- Electrification of Agriculture;
- Information science;
- Construction;
- Transport;
- Logistics;
- Mechanization of agriculture;
- Metallurgy & Metalworking;
- Theory of machines and mechanisms;
- Agricultural machinery repairing.

The permanent exhibition of artworks (paintings) of one of the scholars of the University – V. G. Tsapok, professor, doctor of medical sciences, represented in the library, attracts both students and guests of the University.

***Branch of scientific in educational building № 1.*** The total book collection of the library is 25351 items (books, periodicals, instructions for laboratory and practical works).

Users are provided with academic literature, reading room for 40 seats, free Internet and Wi-Fi access.

The department has academic and scientific literature in:

- Forestry;
- Wood processing technology;
- Park-gardening;
- Landscape and design;
- Floriculture;
- Hunting science;
- Green tourism.

The permanent exhibition of the best graduation works of students (landscape tapestries, paintings, flowers compositions), which are placed on the walls of the library reading room, decorates the interior.

***Branch of scientific in educational building № 10.*** The total book collection of the affiliate is 59040 items (books, periodicals, instructions for laboratory and practical works).

Users are provided with academic literature, reading room for 80 seats, free Internet and Wi-Fi access.

The department has academic and scientific literature in:

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- Economy of enterprises;
- Accounting and auditing;
- Finance;
- Management of organizations and administration;
- Management of foreign economic activity;
- Marketing;
- Economic cybernetics;
- Agricultural economy and organization of agribusiness;
- Banking, taxation & insurance;
- International trade;
- Intellectual property.

***Branch of scientific in educational building № 6.***

The total book collection of the library is 18094 items (books, periodicals, instructions for laboratory and practical works).

Users are provided with academic literature, reading room for 47 seats, free Internet and Wi-Fi access.

The department has academic and scientific literature in:

- Land monitoring;
- Monetary estimation of land;
- Land cadastre;
- Land design;
- Geodesic work in land management;
- Distant land probing;
- Automated land information systems;
- Aerospace survey systems;
- Criminalistics and criminology;
- Civil and tax law;
- Family and inheritance law;
- Administrative law and procedure;
- Notary service board in Ukraine.

***Branch of scientific in educational building № 12.*** The total book collection of the library is 49292 items (books, periodicals, instructions for laboratory and practical works).

Users are provided with academic literature, reading room for 100 seats, free Internet and Wi-Fi access.

The department has academic and scientific literature in:

- Anatomy, histology, cytology of animals;
  - Physiology and pathological physiology of animals;
  - Veterinary sanitation and hygiene of animals;
  - Veterinary microbiology, virology and Immunology;
  - Internal non-contagious animal diseases and clinical diagnostics;
  - Epizootology, parasitology of animals;
  - Surgery, ophthalmology and orthopedics of animals;
  - Veterinary obstetrics and gynecology;
  - Feeding, animal breeding;
  - Veterinary-sanitary examination;
  - Foodstuff safety;
  - Standardization, certification, metrology.
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## INFORMATION AND TELECOMMUNICATION SUPPORT OF THE ACADEMIC PROCESS

The educational space for students is based on the use of the Moodle platform as a learning portal, where all subjects have a comprehensive resource in the form of an e-learning course. All students and teachers of the university have access to the platform. Messengers- viber and telegram are used for instant communication and distribution of messages. Video conferencing systems for synchronous communication such as: Microsoft Teams, Cisco Webex, Zoom and Google Meet are used for remote training.

In order to create a personal educational environment for the student, his / her learning trajectory is supplemented with resources for non-formal education - open online courses (MVOK) offered on various technological platforms.



Fig. 4. Personal educational environment of a student of NULES of Ukraine

It is necessary to work in the corporate segment, having received a corporate account for more systematic use of distance education tools. NULES of Ukraine at the corporate level uses educational services Google, Cisco Webex and Microsoft 365.

The educational portal of NULES of Ukraine is administered by the university specialists, so there is an easy access to analytics of the use of its resources.

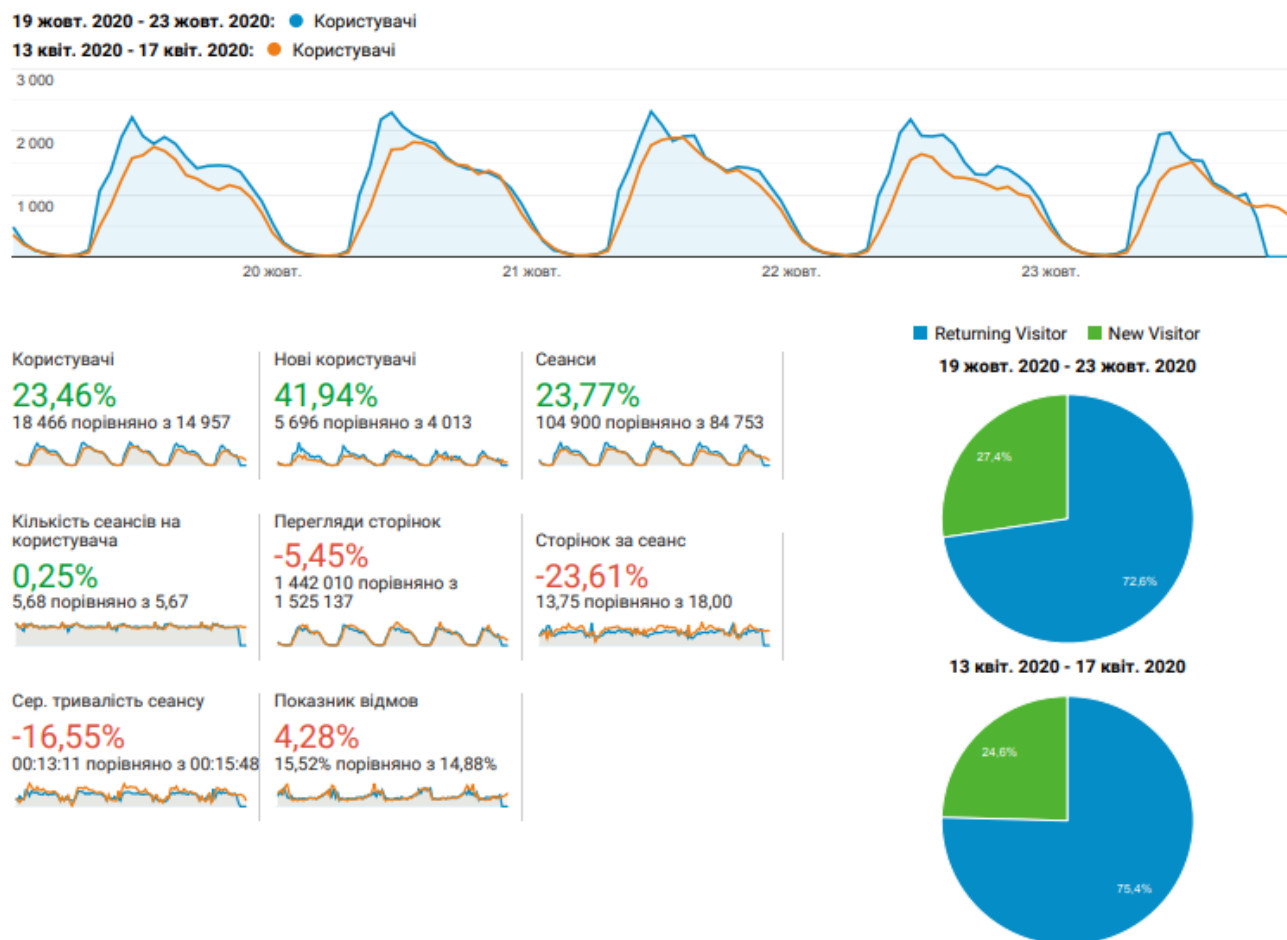


Fig. 5. Analytics of the use of resources of the educational portal of NULES of Ukraine

You can get both generalized data on the duration of sessions, page views per session, number of sessions, etc. using the appropriate Google Analytics module, as well as a more detailed analysis of each course with built-in Moodle tools from given analytics.

In order to quickly adapt teachers to the conditions of distance and blended learning, NULES of Ukraine has developed a refresher course "Distance Education Tools", the program of which includes all the basic technologies for online learning.



## Програма підвищення кваліфікації : «Інструменти дистанційної освіти»

№ пп	Назва розділу та теми
1.	Планування роботи НПП кафедр, адміністративного персоналу факультетів та університету в умовах дистанційного навчання, моніторинг проведення он-лайн занять, організація дистанційної звітності викладачів та опитування студентів.
2.	<b>Огляд інструментів дистанційного навчання</b> для організації навчального процесу у закладах вищої освіти
3.	Методика використання електронних навчальних курсів на платформі <b>Moodle</b> в умовах дистанційного навчання. <b>Інструменти для організації комунікації зі студентами.</b>
4.	Інтегрування он-лайн платформи <b>Zoom</b> в ЕНК на платформі <b>Moodle</b> . Технічні та організаційні аспекти проведення он-лайн занять з використанням <b>Zoom</b> .
5.	Платформа <b>Webex Meetings</b> для проведення онлайн занять. Використання <b>Webex Teams</b> для групової роботи в межах корпоративного акаунту.
6.	Інструменти <b>GoogleApps</b> для дистанційного навчання. Спільна робота з документами.
7.	<b>Google Classroom</b> – інструменти дистанційного навчання для користувачів корпоративних акаунтів. Розміщення навчальних ресурсів та організація навчання використанням інструментів <b>Google</b> .
8.	<b>Google Meetings</b> – інструменти дистанційного навчання для користувачів корпоративних акаунтів. Організація он-лайн активностей з використанням інструментів <b>Google</b> .
9.	Сервіси платформи <b>Microsoft365</b> для управління навчальною діяльністю студентів університету.
10.	Використання <b>Microsoft Teams</b> та он-лайн сервісів <b>Microsoft</b> для організації дистанційного навчання. Робота з документами, ресурсами, завданнями. Організація он-лайн занять, інструменти комунікації.
11.	Використання <b>Календаря та спільних документів Google</b> . Використання сервісів управління бізнес-процесами.
12.	Презентація прикладів застосування інструментів дистанційного навчання (ресурси, відеокастри, вебінари)



**Готовність науково-педагогічних працівників**

Fig. 6. Program of advanced training courses "Distance education tools"



## **THE LIST OF MEMORANDA OF MUTUAL RECOGNITION OF THE EDUCATIONAL SYSTEM, MEMORANDA OF DOUBLE DIPLOMAS, INTERNATIONAL MOBILITY**

National University of Life and Environmental Sciences of Ukraine has been engaged in international activities since 1950.

Internationalization of the University is one of the main priorities for the development of NULES of Ukraine and an integral part of university life. It is developing within a single process of integration of higher education in Ukraine into the international system of higher education. It is worth noting that 2020 year was not the most favorable for the internationalization of the university.

Today NULES of Ukraine cooperates with 137 institutions from 42 countries under cooperation agreements. According to the results of the competition 2017-2022, the University has concluded Interinstitutional Agreements of the Erasmus + Program: KA1 for the implementation of academic mobility with 27 European universities.

Fruitful cooperation with world leading universities contributed to the reforming of the NULESU education system adapting it to the requirements of world universities. Two U.S. universities (Iowa – 1996, 2011 and Louisiana – 1998, 2009), the University of Ghent (Belgium, 2002) and Humboldt University (Germany, 2002) recognized educational system of NULES of Ukraine as the one that complies with their requirements.

Within the period from 2005 to 2020, NULESU signed Memoranda of double diploma with universities-partners:

- Master of Business Administration in Agriculture (MBA) at the University of applied sciences Weihenstephan – Triesdorf (Germany);
- Master of Food and Agribusiness (MFA) at the University of applied Sciences Anhalt (Germany);
- "Energy and automation of biological systems", "Economics and management" at Warsaw University of life Sciences (Poland) ;
- "Ecology", "Social Pedagogy" - Pomeranian university in Slupsk;
- "Economics and management" - Slovakia agrarian university, Nitra;
- "Management of investment activity and international projects" - Foggia University (Italy);
- ISA Lille (France).

These universities and NULES of Ukraine maintain agreements on mutual exchange of scientific and pedagogical staff and students.

The expansion of the geography of international relations, the desire of foreign institutions to cooperate with NULES of Ukraine and the participation of our university in the work of international organizations testify to its recognition and growing authority in the international arena. The growing role of education and science in society, diversification, as well as the internationalization of higher education - these global trends characterize the international component of the university, as a necessary condition for its comprehensive development.

Thanks to active actions in the direction of development of international cooperation, NULES of Ukraine became a leader among agricultural universities of Ukraine in the implementation of the principles of the Bologna Convention, which provides for integration into the European higher education area. This is done to improve employment opportunities and student mobility, as well as to increase international competitiveness in the European higher education area.

Evidence of the new level and prospects of NULES of Ukraine's participation in the world system of international educational and scientific relations is active cooperation with

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FAO UN, NATO, ICA, Visegrad University Association (VUA), European University Association, IAEA, International Union of Forest Research Organizations (IURO) etc.

Every year in NULES of Ukraine:

- about 200 students do training and internship at overseas universities;
- about 700 students have practical training at the leading agricultural enterprises in different countries;
- over 300 lecturers do internship in foreign institutions train, establish cooperation and represent the university in international events.

Over the last 5 years (from 2015 to 2020) about 8000 teachers, scientists, postgraduates and students of NULES of Ukraine took part in various international events (including training, internships, practical training), including:

- participation in the meetings of the Executive Committee of the ICA;
- participation in meetings of the European Association of Universities;
- participation in the activities of the Visegrad University Association;
- participation in MAGATE;
- participation in joint research projects Erasmus+, HORIZON 2020, COST etc.;
- participation in international scientific conferences, seminars, symposia, etc.

Thus, international mobility provides students of NULES of Ukraine with a number of advantages, among which are the following:

- the opportunity to test oneself in a different system of higher education;
  - acquisition of additional knowledge in related fields;
  - use of modern technical equipment in the laboratories and research centers to solve problems;
  - improving the level of knowledge of a foreign language;
  - acquisition of professional work experience during the internship in a foreign company or during the internship in a research laboratory (center), which as a rule is provided in the curriculum;
  - learning about foreign culture, history, customs of the country;
  - the diploma of a foreign University and diploma of NULES of Ukraine according to the double degree programs.
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## **TUTORIAL, SPORTS AND MILITARY-PATRIOTIC ACTIVITIES**

Together with the departments of cultural studies, physical education, Humanities, student government educational work of the University organizes and coordinates TRC educational and social development.

The traditional events University festival "Day of knowledge", international student day, contest "the Beauty of Nubip of Ukraine", the international art festival "Golosiivska vesna", "Donor day" take place annually.

The TRC has organized new events:

- military-sports competitions in fire training "Sniper Nubip of Ukraine";
- Olympiads among students in new sports, such as paintball, pushups, volleyball on the ground and many others;
- competitions "The best intellectual group of NULES of Ukraine", "Song battles", "The best sports academic group of NULES of Ukraine", "Gentleman and beauty of NULES of Ukraine";
- watching movies;
- university project "School of Leadership of NULES of Ukraine";
- training "School for a freshman";
- virtual 3-D tours in NULES of Ukraine;
- volunteer project "NULES of Ukraine for Environmental Protection. One blood flows in us";
- park volleyball tournament among students living in dormitories;
- "Holosiivske ring".

The TRC of educational and social development together with the department of pedagogy organizes scientific-methodological seminars for mentors of academic groups of the first courses that help to apply pedagogical methods and techniques aimed at students' team-building.

According to the order of Ministry of Ukraine for Family, Youth and Sports, Ministry of Education and Science of Ukraine, Ministry of Defense of Ukraine, Ministry of Culture and Tourism of Ukraine № 3754/981/538/49 from 27.10.2009 "On the Concept of national and patriotic education of youth", the department of military training organised both in-classes and out-of-class military and patriotic education of students and school children during the morning inspection.

The department of military training traditionally organizes meetings of generations (with Veterans of Department) hours of memory, educational classes (during army trainings), discussions on the topics "Remembrance day", "The heroic deeds are immortal", "The heroes fought for our country". In particular, during the Year of honoring of the combatants in other lands, in January 2014 the staff of the department arranged an Hour of Courage. Students and staff together with the NGO of soldiers - Afghans laid flowers at the monument to soldiers - Afghans.

The TRC initiated sports competitions "UNI-sportsman" among the staff and students of NULES of Ukraine in 15 kinds of sports. In 2015, the University teams in tug-of-war, powerlifting, arm wrestling were organized.

A permanent commission on monitoring compliance with the internal Rules in the dormitories of NULES of Ukraine has been organized.

Physical education and sports activities at NULES of Ukraine are carried out by staff of the Department of physical education together with the student organization, the Trade Union Committee of employees of NULES of Ukraine led by TRC of educational and social development, by involving students, scientific and pedagogical staff and University employees to go in for physical culture, mass sport and competitive sport.

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The University hold annual competitions "Spartakiada" among the students of the faculties in 12 sports, among the residents of dormitories in 12 sports, "Health" among the scientific and pedagogical staff and employees of structural subdivisions in 6 sports.

Teams of the University and individual athletes participate in competitions at various levels: district, city, national, international and repeatedly won prize-winning places.

The University teams and individual athletes participate in competitions at various levels: district, city, national, international, and regularly become prizewinners. In 2012, in order to promote physical fitness and health of young people, the University built an outdoor playground for mini-football with artificial turf. In 2015-2016, the educational building № 9 which houses the Department of physical education, outdoor volleyball court, stadium were renovated up to modern standards.

No less important influence on the education of students, establishing the basis for the formation of personality of a future qualified specialist, and master of the land, fully developed and harmonious personality has a dormitory. It has become a tradition to hold an annual contest for the best Dorm to identify the best mechanisms of the organization of conditions for living, learning and recreation of students.

From year to year improved the quality of living conditions in hostels Nulesu. Living rooms are equipped with hard and soft items, created conditions for self-study: the work of reading rooms in which there is access to free Internet, conducted educational and cultural work. All hostels run laundromats. For sports in the hostels there are sports room, and in adjacent territories of hostels № 1, 2, 6, 8, 10, 11 renovated playgrounds, in front of the hostel № 12 to the Playground. Student organizations faculties, ERI, and boards of student dorms have meetings rooms.

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## STUDENT SELF-GOVERNING

There is a student organization at National University of Life and Environmental Sciences of Ukraine (SO) which is actively working and developing Student organization (CO). Its activities focus on the organization and consolidation of the students, protection of rights and legitimate interests of students, developing leadership skills, creative abilities by organizing their leisure through the activities of the clubs.

Clubs and cultural centers of SO:

- Club of Experts of NULES;
- Club "City Mafia";
- Science club;
- Media-centre;
- Center of social work;
- Sports club;
- Tourist club "Bars".

In 2019:

- sports chess club "Chess King of NULES of Ukraine", the purpose of which is to promote the development of chess, uniting athletes, coaches, judges, specialists and chess fans among research and teaching staff, university staff, students to improve the professional level of the game was founded;

- club "Cheerful and clever" (KVN) was set up;
- program of education of students of NULES of Ukraine "Citizen, patriot, specialist" was developed.

SO collaborates with many organizations and agencies. Students are members of Student Council under the auspices of the head of Holosiivskyi district of Kyiv city administration, the Student Council of Kiev, the Joint Council of the Ministry of agrarian policy and food of Ukraine. In 2017 student organization of NUBiP of Ukraine signed an agreement on cooperation with the regional children council of Kiev region. Cooperation with the student councils of other universities makes it possible to find new perspectives, to carry out joint activities and to implement projects.

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## ADMISSION TO MASTER DEGREE COURSE AT NULES OF UKRAINE

Admission to the master's program is carried out both at the expense of the state budget (by state order) and under the terms of the contract at the expense of individuals or legal entities. Persons who have obtained a bachelor's and master's degree (educational qualification level of a specialist) are admitted to the training programs for specialists of the Master's degree in accordance with the requirements approved by the Rules of Admission to the Master's Program of NULES of Ukraine.

The list of specialties (educational programs) according to which students are admitted to obtain the degree of "Master" in 2022 (Table 1)

Applicants for a master's degree are registered with the admissions committee for the MCT/ MTAC. Electronic applications are then submitted for admission. They can submit up to five applications for public procurement sites. Submission of applications for competition at the expense of individuals and/or legal entities may be up to 20 applications.

**Table 2.** Deadlines for applications and documents, entrance examinations, competition and enrollment for the Master's degree in the fields of knowledge 05 "Social and Behavioral Sciences", 06 "Journalism", 07 "Management and Administration", 08 "Law", 28 "Public Administration", 29 "International Relations" for all forms of education

Stages of Admission Campaign	Terms
Registration of entrants for the <b>master's test of academic competence and master's comprehensive test</b>	June 27, 2022 - 18 <sup>00</sup> July 18, 2022
Acceptance of applications and documents for training from persons entering on the basis of individual oral interview (certain categories of entrants)	August 16 - August 23 2022
Conducting individual oral interviews (certain categories of entrants)	August 25 - August 31 2022
<b>The main session of the master's test of academic competence and master's comprehensive test</b>	August 10 - August 17 2022
<b>Additional session of the master's test of academic competence and the master's comprehensive test</b>	September 7 - September 10 2022
Registration of electronic offices of entrants, downloading the necessary documents	from August 1, 2022
Acceptance of applications and documents for training from persons who enter on the basis of the results of the master's test of academic competence or master's comprehensive test and / or professional exam in an educational institution	August 16 - September 15 2022
Conducting professional entrance examinations	September 16 - September 18, 2022
Deadlines for publication of the rating list of entrants recommended for enrollment	no later than September 20, 2022
Fulfillment of enrollment requirements by persons recommended for enrollment	until 18 <sup>00</sup> , September 24 2022
Terms of entrants enrollment	by state order - September 25, 2022, at the expense of individuals or legal entities - not later October 10, 2022

**Table 3.** Deadlines for applications and documents, entrance examinations, competition and enrollment of candidates for the degree of "Master" in all other fields of knowledge for all forms of education

Stages of the admission campaign	Terms
Acceptance of applications and documents for training from persons entering on the basis of individual oral interview (certain categories of entrants)	August 16 - August 23, 2022
Registration of electronic offices of entrants, downloading the necessary documents	from August 1, 2022
Acceptance of applications and documents for training from persons who enter on the basis of the results of the professional exam in the educational institution	August 16 - September 15, 2022
Conducting professional entrance examinations	September 17 - September 19, 2022
Deadlines for publication of the rating list of entrants recommended for enrollment	no later than September 20, 2022
Fulfillment of enrollment requirements by persons recommended for enrollment	until 18:00 on September 24, 2022
Terms of entrants enrollment	by state order - September 25, 2022, at the expense of individuals or legal entities - not later October 10, 2022

Entrance tests are conducted:

- in the specialty 081 "Law" - in the form of a master's comprehensive test or a common entrance examination in a foreign language and a common professional entrance exam;
- in the specialties of the fields of knowledge 05 "Social and Behavioral Sciences", 06 "Journalism", 07 "Management and Administration", 28 "Public Administration and Administration", 29 "International Relations" - in the form of a master's test of academic competence and professional exam;
- in other specialties - in the form of a professional exam;
- in the specialties of all fields of knowledge (except specialty 081 Law) when entering on the basis of the degree of "Master" (educational and qualification level "Specialist") in the form of a professional exam or review of motivation letters.



## **AGROBIOLOGY FACULTY**

**Dean** – Oksana Tonha, Doctor of Agricultural Sciences, Associate professor

Tel.: (044) 527-82-13,

E-mail: oksana16095@gmail.com

Location: Building № 4, room 41<sup>a</sup>

Faculty organizes and coordinates educational process of master training in educations programs within specialties:

### **Specialty 201 “Agronomy”**

#### ***Educational program “Agronomy”***

Guarantor of the educational and professional program – Doctor of Agricultural Sciences, senior researcher D.V. Litvinov

Tel.: (044) 527-82-14

E-mail: litvinovdv2018@ukr.net

Departments in charge of graduate training:

#### **Plant Growing**

Tel.: (044) 527-86-26

E-mail: dep.plant@gmail.com

Head of department – Doctor of Agricultural Sciences, Professor, S.M. Kalenska

#### **Agriculture and Herbology**

Tel.: (044) 527-82-14

E-mail: zemlerob1@ukr.net

Head of department – Doctor of Agricultural Sciences, Professor, S. P. Tanchyk

### **Technologies of Storage, Processing and Standardization of Plant Production named after Professor B. V. Lesyk**

Tel.: (044) 527-86-66

E-mail: 1968storage@gmail.com

Head of department – Candidate of Agricultural Sciences, Professor G.I. Podpriatov

#### **Forage production, Melioration and meteorology**

Tel.: (044) 527-85-15

E-mail: kafedra-kormovirobnitstvo@ukr.net

Head of department – Doctor of Agricultural Sciences, Professor G.I. Demydas.

#### ***Educational program “Agrochemistry and Soil Science”***

Guarantor of the educational and professional program – Doctor of Agricultural Sciences, Professor V.O. Zabaluev.

Tel.: (044) 527-81-02

E-mail: viaza@ukr.net

Graduating departments:

### **Agricultural Chemistry and Agricultural Production Quality named after O.I. Dushechkin**

Tel.: (044) 527-88-17

E-mail: quality\_chair@mail.ru

Head of department – Doctor of Agricultural Sciences, Professor A.V. Bykin

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**Soil Science and Soil Protection named after Professor V. I. Shykula**

Tel.: (044) 527-81-02

E-mail: grunt\_nubip@ukr.net

Head of department – Doctor of Agricultural Sciences, Professor V.O. Zabaluev

***Educational program “Selection and genetics of agricultural crops”***

Guarantor of the educational and professional program - Candidate of Agricultural Sciences, Associate professor O.S. Makarchuk

Tel.: (044) 527-86-26

E-mail: Mcar2010@ukr.net

Department in charge of graduate training:

**Genetics, breeding and seed them. prof. M.O. Zelenskoho**

Tel.: (044) 527-86-26

E-mail: breedingdepartment@gmail.com

Head of department – Candidate of Agricultural Sciences, Associate professor O.S. Makarchuk

***Educational program “Agrohimservice in precision agricultural production”***

Guarantor of the educational and professional program – Doctor of Agricultural Sciences, Professor A.V. Bykin

Tel.: (044) 527-88-17

E-mail: biotehtov@gmail.com

Department in charge of graduate training:

**Agricultural Chemistry and Agricultural Production Quality named after O. I. Dushechkin**

Tel.: (044) 527-88-17

E-mail: agrochemistry\_nules@ukr.net

Head of department – Doctor of Agricultural Sciences, Professor A.V. Bykin

**Specialty 203 “Horticulture and Viticulture”**

***Educational program “Horticulture and Viticulture”***

Guarantor of the educational and professional program – Doctor of Agricultural Sciences, senior researcher V.M. Mezhenyky

Tel.: (044) 527-85-59

E-mail: mezh1956@ukr.net

Departments in charge of graduate training:

**Gardening named after Professor V.L. Symyrenko**

Tel.: (044) 527-85-59

E-mail: hortdep@gmail.com

Head of department – Candidate of Agricultural Sciences, Associate professor B.M. Mazur

**Vegetable Growing and Soil under Cover**

Tel.: (044) 527-81-69

E-mail: ovochi.z@i.ua

Head of department – Candidate of Agricultural Sciences, Associate professor I.O. Fedosiy

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 201 "AGRONOMY"  
educational program "AGRONOMY"**

Form of Training:	Licensed number of persons:
– Full-time EPP	98
– Part-time	60
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Agronomy

**The concept of training**

The base of masters educational programs forming in specialty is according exist and perspective of branch and plants growing, supplying variation in system masers educational program for fast adaptation to actually national and international labor needs, integration educational, scientific-researches and innovation activities as example as leadings worlds universities.

Masters' educational program in specialty focus on effective personnel students' educational, which can use adaptive technology agriculture plants growing and supply it's economical, agrarian, energetic and ecology effectiveness. After graduation from university, master can create and realize some actions for improving effectiveness of biological sorts' potential using; forming of harvests productivity and quality depends from soil and climate conditions and elements of plants growing technologies, decision modern industrial and scientific targets in growing technologies. Decision of modern industrial and scientific problems linked with growing technologies, harvest processing and storage plants production.

**Educational and professional program of master's training**

**Areas of employment of graduates**

Agricultural enterprises of different ownership, regional and district administration, advanced farms, companies, holdings and corporations, scientific-research establishments of NAAS of Ukraine.

**Practical training**

Students have the main course a practical educational in scientific-researches farms of NULES of Ukraine: SD of NULES of Ukraine "Agronomy research station", "Velikosnitinske scientific-research farm named aster O. Musichenka" and leading agricultures firms different forms, educational-scientific laboratories of NULES departments and some scientific-research organization of NAAS and NAS of Ukraine.

**Proposed Topics of Master's qualification Theses**

1. Features of formation of species composition and patterns of germination of weeds in crops agrocenoses.
  2. Change in soil fertility and efficiency of growing crops under different farming systems.
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3. Analysis and improvement items intensive farming systems at the farm.
4. Optimization measures to protect crops from weeds.
5. Features of agricultural cultivation crops for farms of different ownership forms and soil and climatic conditions.
6. The adaptive potential of the agricultural crops in the northern steppes of Ukraine.
7. Technological and biochemical properties of grain different purpose depending on the ways, regimes of post harvest handling and storage.
8. Chemical and technological evaluation suitability raw materials of fruit and vegetables (technical crops) for storage and processing.
9. Biochemical and commercial value of fresh and canned fruits and vegetables, depending on the factors of post harvest handling, storage and processing.
10. Evaluation of performance pilyaukisnoho growing forage crops depending on their species composition in certain languages economy.

**Curriculum of Master training  
in educational program "Agronomy"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Methodology and organization of scientific research on the basics of intellectual property	4	exam
CC 2	Biometrics	6	exam
CC 3	Management of risk factors in agriculture	5	exam
CC 4	Pedagogy and psychology	4	test
<b>Total</b>		<b>19</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 5	Modern agricultural systems	6	exam
CC 6	Innovative technologies in plant science	6	exam
CC 7	Technological audit of storage and processing of crop products	6	exam
CC 8	Modeling of productivity of forage crops	4	exam
CC 9	Logistics and innovation of postharvest handling, storage and processing of crop products	5	exam
CC 10	Energy-saving technologies in forage production	6	exam
CC 11	Production Practice	10	differentiated test
CC 12	Preparation and defense of master's qualification thesis	4	
<b>Total</b>		<b>47</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
OC 1.1	Integrated pest control in modern farming systems	4	exam
OC 1.2	Scientific bases of agriculture		exam
OC 1.3	The adaptive farming systems		exam
OC 1.4	Theoretical and practical bases of crop rotations		exam
OC 1.5	Tillage in modern farming		exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 2.1	Adaptive technologies in Plant Growing	4	exam
OC 2.2	Features of growing crops technologies in the current farming systems		exam
OC 2.3	Energetic plant resources		exam
OC 2.4	Technology seeds and planting material of crops production		exam
OC 2.5	Prognosing and programming of yields field crops		exam
OC 3.1	Quality and logistics crop production in modern farming systems	4	exam
OC 3.2	Certification and commodity of crop-growing products		exam
OC 3.3	Technology and chemical control of crop production		exam
OC 3.4	Material and technical base of crop production logistics		exam
OC 3.5	Energy-saving technologies in the branch of storage and processing		exam
OC 4.1	Intensive cultivation technology of forage crops for seed	4	exam
OC 4.2	Modern technologies of unconventional forage crops		exam
OC 4.3	Innovative technologies in fodder production		exam
OC 4.4	Intensive technologies for growing new fodder crops for seeds		exam
OC 4.5	Effective use of meadows		exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE

##### Compulsory components of EPP

**Methodology and organization of research with the principles of intellectual property.** The course is aimed at obtaining the necessary in-depth knowledge of scientific studies on agronomy, method of application methods agronomic research and perform observations of phenomena, principles of planning research in different parts of the field of agriculture - in crop production, vegetable growing, gardening. It is also important features of mastering technique and organization of research in terms of soil erosion, reclamation of agriculture. Of particular importance this subject matter in the case of acquisition of skills skilled use statistical methods interpreting experimental data using modern computer programs and knowledge and understanding of the regulatory framework for copyright protection of intellectual property.

**Biometry.** The course provide formation the skills of effective management in research, planning and organization of experiments; summarizing and analysis of experiment results. Student will be able to make summarizes based on relative information; to assess the working hypothesis with quantitative methods in crop production and plant science. The aim of course is to study of the object, to establish the impact of controlled and uncontrolled factors, relation between this factors; to evaluate their relation based on scientific principles; to obtain and implement useful results in industry and science.

**Management of risk factors in agriculture.** The discipline provides master's students with theoretical knowledge and practical skills in biological risk factors in agriculture and modern approaches to protecting crops from weeds, pests and pathogens. The aim of the discipline is to form a master's systematic approach to the place, role and importance of biological risk factors, practical management of them under modern farming systems. The above will allow the master to develop economically and environmentally

sound measures to manage risk factors in agriculture under different soil and climatic conditions.

**Pedagogy and psychology.** The purpose of teaching the discipline is the formation of psychological and pedagogical competence of students in matters related to psychological and pedagogical features in the field of agronomy, equipping them with modern educational technologies, methods of creative search for future professionals; formation of interest and readiness for independent knowledge of the problems of didactics, theory and methods of vocational education. The main objectives of the discipline are to acquire practical skills of pedagogy and psychology, necessary for further activities in the field of agronomy, namely: rational planning and organization, the ability to demonstrate basic skills of pedagogical knowledge, generate new ideas, use knowledge of psychology and pedagogy in organizing production activities.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Modern agricultural systems.** The purpose of the course is the formation of students' knowledge and skills with scientific foundations of systems of agriculture that are environmentally safe and economically feasible measures of farming cultivation and protection of crops, the rational design of crop rotations, tillage systems and erosion control measures, peculiarities of conducting adaptive, industrial, conservation, environmental, biological (organic) systems of agriculture and farming in contaminated areas.

**Innovative technologies in Plant Science.** Academic discipline is aimed at the formation an expert of higher education of degree the "Master" specific understanding thereof, that every modern innovative technology in Plant Science is holistic, clearly defined and scientifically grounded system with complex of irreplaceable, interrelated elements, that perform a specific function, and together they are function of the system, the task of which is obtaining stable crops with high quality crop products. Innovative are the key to success and profitability of agricultural production. That is why the main tasks the academic discipline "Innovative technologies in Plant Science" are mastering theoretical knowledge and acquisition of skills with development of practical innovative elements of technologies of cultivation of field crops on based deep knowledge their biological properties and taking into account the features of growth and development of the plant organism in ontogeny. The basis for developing innovative elements in technology is studying the experience of the most effective innovative technologies the plant crop sector in countries of the world and successful enterprises and companies in Ukraine. This ensures the formation of specialists which adapted to the requirements of the labor market in the field of agricultural production. After studying this discipline, students become competencies: knowledge and understanding of ways to increase the yield and quality of field crops through the introduction of innovative elements in cultivation technologies for efficient cultivation and economically viable crop production; ability to apply acquired knowledge to solve practical problems in production conditions.

**Technological audit of storage and processing of crop products.** The discipline examines ways of checking the technological state of enterprises with postharvest handling, storage and processing of plant products, technologies which using and production facilities by complex of specific criteria, that allows to identify strengths and weaknesses sides, identify dangerous factors, establish corrective actions and develop perspective plans of their progress. Also, the discipline involves a detailed mastery of the methods of development and implementation of the HACCP system on the enterprises for storage and processing of plant products, that allows obtain safe products and promotes international trade. Studying the discipline will allow students to carry out analysis of

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hazard and control (regulation) in the critical points of production, to identify, evaluate and control biological, chemical, physical factors, materials or products that may be adversely affect on the human health.

**Modeling of productivity of forage crops.** The discipline program provides for the disclosure of the concept of forage productivity, a modeling process, which is a qualitatively higher stage in the development of technologies for cultivation of field crops, which allows to assess the impact of the environment on growth processes and manage the levels of plant productivity. Model that reflects the response of plants to moisture supply using optimal balance, the use of a small number of inputs, taking into account biophysical processes in the soil and modeling in the system "plant-soil-moisture-harvest".

**Logistics and innovation of postharvest handling, storage and processing of crop products.** Master's study in this discipline to direct on the effective individual training of a specialist which able to apply adaptive technologies and deeper penetration of students into the essence of innovative technologies of post-harvest handling, storage and processing of the main types of grains, fruits, vegetables and raw materials of the technical crops; study of the features of technology of handling, storage and processing of each type of crop products on the high scientific level, which will ensure the carrying out of works with handling, storage and processing of crop products with the least losses and ensures the receipt of competitive and environmentally friendly products. The course provides for the study of resource management of economic activity of various forms of ownership and product flows directed from producers to consumers that including information, financial and service support (warehousing, transportation, etc.) of these processes. In the current market conditions of production, training professionals in logistics and innovation in post-harvest handling, storage, processing and quality of crop products, will help to ensure the food security of the country, will solve the problem to supply of industry by products with high quality and guaranteed degree of safety for humans, animals and the environment, with minimal costs of raw materials, resources of energy and will be supply uninterrupted operation of many types of industry: food, light, fragrance, energy and others.

**Energy-saving technologies in forage production.** The program of the discipline is supposed to be developed by future specialists the professional ability to solve the issue of intensification of the branch, provided the introduction of alternative energy and resource-saving technologies for the cultivation of forage crops and the production of quality, balanced feed without harming the environment.

### **Optional components of EPP** ***Free choice according to specialty***

**Integrated pest control in modern farming systems.** Lectures on discipline aimed at highlighting the theoretical foundations and methodologies of monitoring of the presence of harmful organisms in agrophytocenoses and of their prediction in a production environment. Topics of laboratory and practical course provides students acquiring practical skills of these types of works on production crops, as well as analysis and evaluation of the results of monitoring and forecast the spread of harmful organisms in different farming systems.

**Scientific bases of agriculture.** The scientific bases of agriculture are covered: their historical development; ways to address the issues of expanded reproduction of soil fertility; rational use of land, protection against erosion and obtaining high sustainable yields of crops. The study of the discipline will allow students to specify the methods of agricultural land use depending on the characteristics of soil and climatic conditions, the level of anthropogenic impact, the degree of intensification of production, the nature and degree of soil degradation.

**The adaptive farming systems.** The course is aimed at a comprehensive and deep study of all parts of modern farming systems (system of crop rotation, tillage,

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fertilization, control of weeds, pests and diseases, combating water and wind erosion, land reclamation activities, etc.), which are closely interrelated, consider and implement soil and climatic conditions, level of economic development of economy, its material and technical base, and other conditions. Ukraine has developed a modern system of agriculture for each region and even to specific households based on their specificity based on the principles of resource conservation and ensuring environmentally friendly and safe products. The theoretical basis of modern systems of agriculture are the agriculture laws, the doctrine of the soil fertility and rational use of land.

**Theoretical and practical bases of crop rotations.** The lecture course on the discipline covers the theoretical foundations of crop rotation; formation of crop rotations in different natural and economic conditions and their practical application in Ukraine; intermediate crops in crop rotations and substantiation of their possible application; the importance of crop rotations in the formation of soil fertility; introduction and development of crop rotations; features of application of short-rotation crop rotations and practical recommendations of possibilities of transformation of multifield crop rotations into short-rotation; practical application of crop rotations with crop rotation only in time, the formation of crop rotations in organic farming.

**Tillage in modern farming.** The course covers the scientific basis of resource-saving technologies of mechanical tillage and their practical application in different soil and climatic zones of Ukraine; theoretical bases of tillage; main theoretical provisions of scientific and practical significance of tillage systems in different soil and climatic zones of Ukraine, the formation of tillage systems for organic farming.

**Adaptive technologies in Plant Growing.** The discipline involves formation of complex knowledge about specific reactions of species, varieties and hybrids of plants on action biotic, abiotic and anthropogenic environmental factors and development of adaptive cultivation technology to obtain stable yields of quality products based on compliance needs of plants, energy saving and environmental security. Aimed at solving theoretical and practical problems of increasing productivity cultivated species, quality and environmental cleanliness of products, a comprehensive study of forming stable agroecocenosis field crops through the possession of knowledge theoretical principles resistance to environmental factors. Course discipline includes the following sections: Bases of adaptive use natural, biological and man-made resources. Global plants resources and their role in improving adaptability of species. Biodiversity. Biodiversification. Introduction and mechanisms of plant adaptation to environmental factors. Ecological and genetic basis of adaptive Plant Growing. Environmental and biological characteristics of plant growth and development. Ontogenesis and morphogenesis. Monitoring of implementation the biological potential. Botanical characteristics (type, family, genus): structure of plant, growth and development, and makrostagesmikrostages. Requirements for the soil, climate and weather conditions. Integrated requirements. Mechanisms of yield formation and yield quality. Stability and flexibility of varieties. Winter hardiness, drought resistance, salt resistance of plants and ways to optimize them. The link between adaptation and resistance of plants. Managing of field crops yield formation. Technological and adaptive systems of intensification crop production. Balanced system of crop production on different levels of anthropogenic impact. Ecological, food and energy security. Implementation of genetic potential plants with using growing technologies a different level of anthropogenic impact. Design of adaptive agroecocenosis. Model of plant and agroecocenosis in according to planned productivity. Choose of variety - adaptation and stability. Suitability for region of growing, potential yield, product quality, resistance to pests, resistance to stress factors, resistance to sprouting. Stability and flexibility of varieties. Winter hardiness, drought resistance, salt resistance of plants and how to optimize them. The link between adaptation and resistance of plants. Requirements to nutrients. System of mineral and organic fertilizers

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application. Anti-stress drugs. Classification of growth regulators. Using of growth regulators in cereals crops, the systematic action of drugs. Diseases, pests, weeds and principles of crops protection. Losses from clogging. Aftereffects of pesticides.

**Features of growing crops technologies in the current farming systems.** In basis of modern farming systems is developing new and optimize existing elements of zonal technologies for growing crops, based on the maximum implementation of the biological potential of modern varieties and hybrids and bioclimatic potential of production area, adapted to the specific growing conditions and improvement of traditional resource-conserving, intensive technologies on base of using chemicals and biologization. The theoretical basis for modern farming systems is to deepen basis of formation high-performance communities of crops due crop management of productivity process through innovative farming practices that will reduce the gap between potential and real productivity of plants. Innovation is based on the principles of ecologization technologies of growing crops, their differentiation according to the specific soil and climatic conditions in the adaptive systems of agriculture, adapting technologies to different level of intensification agricultural production, to production and resource potential of producer. In these technologies achieved maximum realization of genetic potential of varieties and hybrids considering soil and climatic conditions.

**Energetic plant resources.** The course aims at developing by future professionals technological training in promising areas of production and processing of valuable plant material in Ukraine. The discipline program provides familiarization with the genofond (generic, species, varieties diversity) yield potential, productivity of energy and raw crops, biological, ecological, biochemical features of plants, main exit and sideline products, important substances and energy per unit area. Students learn the peculiarities of growing technology, harvesting, storage and processing the most promising areas of complex using plants. It is based on knowledge of resource potential of plants, especially their growth, development, following of production processes. Plants relating to environmental factors, modern technology of growing high yields of the best quality at the least financial, economic and energy costs. Much attention is paid to bioecologization of growing technologies, which involves reducing the pesticide load on agrophytocenoses, increasing of soil fertility by using potential of cultivated crops and green manures.

**Technology seeds and planting material of crops production.** The course covers theoretical and practical issues of modern growing technologies, harvesting, handling and storage of high-quality seeds and planting material of crops. Seed production of crops in sufficient quantity and with high yielding properties is only possible under optimal growing conditions. In this regard, the best precursors for this culture should be given under the seed crops; all work from soil preparation and planting to harvesting should be carried out promptly and efficiently; providing nutrients and plant protection from diseases, pests and weeds are mandatory. Disclose main differences between commodity and technology seeds of major field crops. Disclose complex of special measures aimed at accelerated reproduction of high-quality seeds, preserving its purity and forming of high sowing qualities and yield properties. The course reveals the essence of varietal farming, important measures which are the right choice of predecessors and doses of mineral fertilizers. It is also a means of maintaining a variety at a high level of productivity, so seed producing with high yielding properties. Much attention is given to the modified changes, accumulated in seeds, which caused by the conditions of its cultivation and significantly contribute to the next generation, its productivity. Favourable growing conditions can be detected as a short-term after-effect of positive modifications, which reflected directly on the seeds of current harvest: best his physical, biochemical and seed qualities.

**Prognosing and programming of yields field crops.** The course aims to familiarize with new developments of agricultural and biological sciences, disclosure of

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various biological phenomena, methods of control and accounting on crops of field crops, which is allowing correcting process of yield formation and product quality. The purpose of discipline is mastering by complex agronomic evaluation methods of specific soil and climatic conditions and obtain practical skills farming system development and organizational measures to ensure the harvest of a given size and quality. During the course students get acquainted with scientific methods of yield formation management, which provide forecasting, planning and organization of production. This is allowing to transfer production process a certain type of crop products on scientific, strictly controlled, high-quality base and thus realize one of the most promising areas of science and technology - programming yields. The discipline involves development of program, that is to say optimal proportion of controlled factors take into consideration low-adjustable and unregulated weather conditions, which are in manufacturing process ensure planned productivity, with most economical use of available resources.

**Quality and logistics crop production in modern farming systems.** The course teaches methods of monitoring and evaluation of quality of plant products, innovative scientifically justified logistic schemes of handling, that providing high quality processes (cleaning, drying) - minimum injuries, high vitality of food grain and seed destination. It teaches scientifically logistic schemes of handling the harvest of potatoes, vegetables, pomes fruits, which provide them high commodity value at realization. The course teaches scientifically technologies of handling, storing all kinds of raw materials of industrial crops, which will provide a maximum output of finished products - sugar, starch, oil and others. The course teaches research ways and regimes of storage and processing, which taking into account the growing conditions, harvesting, post harvest handling and transportation of grain mass, consignment of juicy products and other plant materials.

**Certification and commodity of crop-growing products.** Discipline that studies general information about the types, systems and procedures for certification of crop products. Teaches the requirements of commodity levels of the main types of grain for various purposes, methods by which to determine the affiliation of marketable products to a particular class of grain, variety (variety) of vegetables and fruits. Considers methods for determining the condition of sugar beets, the number of flax raw materials, the rules of payment for sold grain, oilseeds, potato tubers for various purposes, vegetables, fruits, grains, legumes and berries.

**Technology and chemical control of crop production.** In the course Masters study the biochemical significance yield of major crops and tasks of techno-chemical control on the stages of primary processing, industrial processing and storage of basic types different crops (flour, cereals and oilseeds), fruit and vegetable, potato, industrial raw materials (flax-fibred, hops, tobacco, sugar beet and grapes). The course used knowledge of physiology, microbiology, plant pathology, fruit growing, vegetable growing, standardization, plant growing, and technology of storage and processing of crop production. Discipline teaches modern methods of control of crop production based on a comprehensive knowledge of the properties of products, taking into account their change depending on factors that may act on it during transport, post harvest handling, storage and processing.

**Material and technical base of crop production logistics.** The master's students study the technological equipment that used in post-harvest handling of different types and purposes of grain (cleaning, ventilation, drying) and consider the selection of equipment depending on the grain type, its quality and quantity. They will acquaint with the requirements for the arrangement of the barn floor and its main elements and the technological characteristics of granaries for storage of grain and grain products. The students study equipment that used for processing various grains (cereals, legumes, oilseeds, technical) on the flour, groats and oil. Master's students get acquainted with the equipment for post-harvest handling and processing raw material of fruits and vegetables

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for various types of canned food (juices, purees, jams, etc.) and with the peculiarity of construction of vegetable stores, freezers, refrigerators and buildings for storage of finished canned products.

**Energy-saving technologies in the branch of storage and processing.** The discipline is topical because it teaches future specialists resource-saving technologies for obtaining environmentally friendly products from plant raw materials. Energy-efficient ways of handling (drying, cleaning), storage and processing of different types of crop products that will provide environmentally safe finished products are studied. The problems of ecology, emissions into the environment, possible ways of reducing dangerous factors during storage and processing of plant raw materials are considered.

**Intensive cultivation technology of forage crops for seed.** The course studies adaptive cost-effective and environmentally friendly technologies for growing fodder crops for seeds, including the features of technological measures of soil cultivation, sowing technology, care of seed crops, harvesting, post-harvest processing and storage of seeds. The program provides for consideration of issues regarding the impact of individual technological measures on the sowing quality of seeds, methods for their determination and cost-effectiveness of production of fodder crop seeds. Will be acquainted with the work of the main centers for the production and sale of seeds of perennial grasses, mastered the domestic and foreign experience of seed production.

**Modern technologies of unconventional forage crops.** The program provides for the disclosure of discipline adaptive cost-effective, environmentally friendly technologies of unconventional forage crops for the purpose of their spread in agriculture. The methods of programming the yield of unconventional fodder crops, the measures of creating high-yielding forage areas on field lands, the conveyor production of forages and the organization and methods of increasing the productivity of forage crop rotations are also studied.

**Innovative technologies in fodder production.** In the current conditions of development of fodder production, innovation is one of the key factors that determine its efficiency. Discipline is important theoretical and industrial value, because it teaches the student to use a comprehensive, systematic approach to the cultivation of forage crops with advanced specific elements of technology to provide livestock with high-grade forage

**Intensive technologies for growing new fodder crops for seeds.** The course studies adaptive cost-effective and environmentally friendly technologies for growing fodder crops for seeds, including features of technological measures of tillage, sowing technology, care of seed crops, harvesting, post-harvest processing and storage of seeds. The program provides consideration of the impact of certain technological measures on sowing quality of seeds and methods of their determination, study of economic efficiency of fodder seed production, operation of major centers for production and sale of perennial grass seeds, development of domestic and foreign experience of seed farms.

**Effective use of meadows.** Meadow pastures occupy large areas in Ukraine, and the directions of their use are growing today. First of all, meadows are an important reserve for increasing livestock production and an important factor in increasing its economic efficiency. Therefore, the course examines the technological ways of effective use of meadow systems, taking into account natural and territorial conditions, legal norms and climate change, studies innovative approaches to the organization of meadow lands that can maintain long productive longevity of perennial grasses and their high yields. the state of meadow pasture systems, which allows to control the quality and safety of fodder from them and to influence the degree of technological and environmental load on pasture systems. The discipline program also introduces other promising areas of meadow land use: as a significant recreational resource and a source of primary biomass for renewable energy technologies.

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 201 "AGRONOMY"  
educational program "AGROCHEMISTRY AND SOIL SCIENCE"**

Form of Training:	Licensed number of persons:
– Full-time EPP	42
– Part-time	35
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Agronomy

**The concept of training**

The modern agricultural industry needs high qualified specialists in agrochemistry and soil science. The program of the magister mastering is directed to formation of the knowledge and skills in methodological and agrotechnical fields of the agrosoil science and agrochemical service of the agricultural organizations, elements of the precision agriculture and energy save crop production systems, analytical and practical using of the modern methods of the soil fertility control, crops nutritive conditions and formation of the quality of the crop products, the elaboration of the conceptual and practical basics of the crop fertilization systems and agrochemical documents, development of technologies and measures to improve soil quality, soil quality monitoring, prevention of soil degradation, optimizing of biodiversity in soil, implementing of soil conservation technology.

**Educational and professional master's program**

**Areas of employment of graduates**

The industrial sector field crop agriculture, agribusiness, public health agencies soil fertility and crop agrochemical service. Graduates can be employed in the system of regional branches of the Agency of Land Resources Research Institute "Ukrzemproekt" in the system design and exploration centers "Oblderzhrodyuchist" in any agricultural enterprise in positions agronomist, agronomist-ohrohimika in System Security Service of soils as an engineer, soil scientists; In the banking sector in positions of experts to assess the soil; system of quarantine and customs services of Ukraine for positions related to the assessment of soil quality and ecological condition of the environment; in commercial and public establishments that manufacture and sell chemicals (fertilizers, pesticides), make agrohimservis agribusinesses, conduct a comprehensive agrochemical diagnosis and diagnosis of plant nutrition as a manager (professionals, specialists) with sales and scientific support, specialists in agricultural chemistry, managers, promoters, agrochemists analysts, logisticians to ensure fertilizer plant nutrition consultants; in environmental inspections, system service protection soil inspection in rational use and protection of land in positions to control the environmental state of the environment assessment of soil quality.

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### Practical training

Students receive practical training in research farms of NULES of Ukraine: separated subdivisions “Agronomic Research Station” and “Velykosnytynske Education and Research Farm named after O. Muzychenko”, at research institutions of Academy of Agricultural Sciences and Academy of Sciences of Ukraine, National Centre of soil fertility conservation, the State Committee for Land Resources, educational and scientific laboratories of NULES of Ukraine.

### Proposed Topics of Master's qualification Theses

1. Agrochemical performance management of crops.
2. Integrated agrochemical diagnosis
3. Development of the use of chemical fertilizers and meliorants in agribusiness.
4. Agrochemical providing resource-saving technologies of cultivation of crops.
5. Change the properties of soil for implementing resource saving technologies and precision farming.
6. Agroecological efficiency technologies No-till.
7. The mechanisms of formation of microaggregates agrocenosis and performance under different tillage systems and crop fertilization.
8. Impact of lithological factor in soil formation tehnosystem on reclaimed lands.
9. Play in typical black soil fertility in terms of field and vegetable crop rotations.
10. Change the water-physical and physical-chemical properties of typical chernozem minimizing tillage and biologization agriculture.

### Curriculum of Master training in educational program “Agrochemistry and Soil Science” (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Methodology and organization of scientific research in agrochemistry and soil science with the basics of intellectual property	6	exam
CC 2	Soil resources of Ukraine and the world	5	exam
CC 3	Logistics for crop production systems and realization of crop products	8	exam
CC 4	Pedagogy and psychology	4	test
<b>Total</b>		<b>23</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 5	Assessment and management of soil quality	6	exam
CC 6	Technological agroservice for agricultural lands usage	12	exam
CC 7	Reclamation and reclamation of disturbed lands	5	exam
CC 8	Soil degradation and technologies of soil fertility reproduction	6	exam
CC 9	Production Practice	10	differentiated test
CC 10	Preparation and defense of master's qualification thesis	4	



Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>Total</b>		<b>43</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to specialty</b></i>			
OC 1	GIS technologies in agrochemistry and soil science	4	exam
OC 2	The system of the modern special agrochemicals application	4	exam
OC 3	Phytomelioration and phytoremediation of degraded lands	4	exam
OC 4	Soil chemistry and biology	4	exam
OC 5	Monitoring and certification of soil resources	4	exam
OC 6	The regulation of the crop nutrition for greenhouse and for fertiigation	4	exam
OC 7	Drones in agronomy	4	exam
OC 8	Smart plant nutrition management	4	exam
OC 9	Field agrochemical scouting	4	exam
OC 10	Laboratory diagnostics of soils and lands	4	exam
OC 11	Soil risks in agricultural production	4	exam
OC 12	Qualitative assessment of soils and lands	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Methodology and organization of scientific research in agrochemistry and soil science.** Discipline generates knowledge and skills that allow you to properly conduct a scientific research or production experiment with the consistent establishment of their purpose, object and object, the planning and repetition of the experiment, mathematical processing of results for sound formulation of conclusions. Used for production testing of techniques, technologies, systems of agriculture with the development of proposals for implementation. Methods of statistical analysis and elements of mathematical modeling of processes are given.

**Soil resources of Ukraine and the world.** Studies the patterns of spatial distribution of soils and is the basis of their accounting and evaluation as a natural resource. Basic principles of genetic classification of soils and new approaches to classification of soils on an ecological-substantial basis, criteria for selection of taxonomic units of genetic classification and diagnostics of soils. Spatial heterogeneity of soils on the earth's surface and patterns of soil distribution in nature. Limits of spatial heterogeneity of soils. Horizontal and vertical soil heterogeneity. Regularities of soil placement in nature. Latitudinal and mountain regularities (zoning) of soils. Azonal and intrazonal placement of soils. Placement of soil cover in topographic series, provinces and microzones. Laws of relations between soil formation factors (climate, parent rocks, relief, vegetation), genesis and morphological and biological features of soils. The concept of microzonality of soils in mountainous areas: inversion, interference and migration.

**Logistics for crop production systems and realization of crop products.** The goal of the studding of the theoretical materials and laboratory classes are mastering for master into theoretical knowledge and practical skills to organize process of selection of agricultural machines and to calculate farm needs into they and their congestion for supplying of effective work of farms. Future specialists take skills to estimate climate risks and territorial risks and technological risks leading of plangrowing. Therefore, they may

make management and marketing of agrochemical resources effectively for formation of crop products with high quality during crop vegetation and during its refinement.

**Pedagogy and psychology.** The purpose of teaching the discipline is the formation of psychological and pedagogical competence of students in matters related to psychological and pedagogical features in the field of agronomy, equipping them with modern educational technologies, methods of creative search for future professionals; formation of interest and readiness for independent knowledge of the problems of didactics, theory and methods of vocational education. The main objectives of the discipline are to acquire practical skills of pedagogy and psychology, necessary for further activities in the field of agronomy, namely: rational planning and organization, the ability to demonstrate basic skills of pedagogical knowledge, generate new ideas, use knowledge of psychology and pedagogy in organizing production activities.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Assessment and management of soil quality.** The main place in the rational and efficient use of natural resources is land use, conservation and Soil Fertility Improvement. Studies understanding of the processes taking place in soils is an important condition for the realization of these objectives. Especially important is the ability to manage processes and soil regimes and on this basis to improve soil fertility.

**Technological agroservice for lands usage.** The goal of the studying of the theoretical materials and laboratory classes are mastering for master into theoretical knowledge and practical skills into methods and practice agrochemical supplying and service for plantgrowing, planning and organization of the agrochemical service, etc. Future specialist takes skills in control, realization and application of the chemical preparation in agriculture and organize effective relationship between the producer and organizations different ownership and determine the efficiency of agrochemical service in agroorganizations.

**Reclamation and reclamation of disturbed lands.** The use of various land reclamation technologies on disturbed lands is necessary to improve the fertility of technosoils in the post-cultivation period for use in agriculture or forestry. The following types and methods of land reclamation are studied: geoconstruction (earthing, clay, sandblasting, formation of waterproof and water-saturated horizons); cultural (cleaning from self-overgrowing of bushes and trees, from household, construction and other garbage, as well as from other objects that complicate the use of the site for its intended purpose); biological (phytomelioration, silting, afforestation, bioconservation, mycorrhization, greening), as well as chemical, hydro and agro-technological reclamation. Types of reclamation and methods of reclamation works are used depending on the features of the engineering stage of reclamation of disturbed lands, taking into account the economic and natural conditions of a particular region to obtain the best environmental, economic and socio-aesthetic effects.

**Soil degradation and technologies of soil fertility reproduction.** The course will allow students to master the scientific principles of reproduction of soil fertility on the basis of soil and energy conservation. It aims at a comprehensive assessment of existing technologies for growing crops in terms of their impact on soil fertility. Particular attention will be paid to the study and understanding by students of measures to restore soil fertility, taking into account specific conditions, including genesis, soil properties, their structure, location by relief elements, groundwater level, and characteristics of crops. As a result of studying the discipline, students acquire theoretical and practical knowledge about the peculiarities of soil fertility reproduction, which have been affected by agrophysical degradation, dehumidification; acidic, saline, saline, eroded and contaminated soils.

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**Optional components of EPP*****Free choice according to specialty***

**GIS technologies in agrochemistry and soil science.** By studying the lecture and practical course of the discipline, the future specialist will gain theoretical knowledge about the possibilities and limitations of GIS and all analytical processes related to them, will form an understanding of the importance of scale, projection and topology for the ability to visualize the world. The master will master practical skills in obtaining geospatial data, determining the area of the landfill, construction of buffer, raster and vector overlay, calculation of landscape indicators, creating maps and their use. To perform these and other functions learn to work with software: Manifols GIS, Global Mapper, webportal Agrilab.

**The system of the modern special agrochemicals application.** The goal of the studding of the theoretical materials and laboratory classes are mastering for master into theoretical knowledge into range and properties of the special agrochemicals and practical skills into their application, leveling of the environmental stresses and realization of the genetic crop potential.

**Phytomelioration and phytoremediation of degraded lands.** Studies measures to restore disturbed and degraded lands to a biogenic state, in particular for use in agriculture, for forest plantations, creation of recreation areas, construction and stocking of artificial reservoirs, ie the creation of landscapes in harmony with the natural environment. The purpose of the discipline is to study the parameters and assessment of overburden, classification of disturbed lands, development of measures to restore their fertility.

**Soil chemistry and biology.** Studies chemical, physicochemical and biological processes that shape soil fertility and productivity of agrocenoses. It is the knowledge of the essence of these processes with the participation of individual chemical elements, colloidal systems and groups of organisms, together with methods of their regulation, makes it possible to maintain a high level of soil fertility. They are also the basis for predicting the evolution of soils and their rational use.

**Monitoring and certification of soil resources.** Soil quality monitoring is a system of observations, quantitative assessment and control over the use of soils and lands in order to organize the management of their productivity. To diagnose the condition of soils it is necessary to possess and be able to interpret the following complex informative indicators: change in soil structure, land transformation, assessment of rates of change of basic soil properties, assessment of erosion intensity, reclamation status indicators, assessment of effective soil fertility. The purpose of this discipline is to teach methods for monitoring soil quality in order to control and prevent the negative development of soil formation processes.

**The regulation of the crop nutrition for greenhouse and for fertiigation.** The goal of the studding of the theoretical materials and laboratory classes are mastering for master into theoretical knowledge and practical skills into basics to regulation of the crop nutrition in green houses and for fertiigation, factors of the formation of the crop productivity in green houses and their interaction according to crop biological specifications and technical properties of the agricultural organization, creation of the models for nutrition regimes for crops in green houses and management them according to crop biological specifications during crop vegetation.

**Drones in agronomy.** The purpose for theoretical and practical study of the discipline is the formation in masters of theoretical knowledge to understand the possibilities of using drones in modern technologies of growing crops (monitoring of soils, plants, agrochemicals, sowing of green crops, trichogramma, etc.) and practical skills to organize effective work drones in the field for various purposes in compliance with the

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necessary logistical measures, as well as the acquisition of practical skills in drone management.

**Smart plant nutrition management.** The purpose of theoretical and practical study for the discipline is the formation in masters of theoretical knowledge and practical skills to manage crop productivity, taking into account the internal field variability of the field and optimize the use of consumables; to improve the existing equipment, controlled by the on-board computer and capable of differentiated agrotechnical operations; use professional Internet portals, mobile applications, GIS field monitoring programs for successful management of agricultural resources.

**Field agrochemical scouting.** The purpose of theoretical and practical study for the discipline is the formation of masters' theoretical knowledge and practical skills for the organization and implementation of comprehensive agrochemical diagnostics of crop nutrition with modern portable tools, as well as maintaining the functional state of devices.

**Laboratory diagnostics of soils and lands.** Methods of soil sampling for agrochemical survey, physical properties, intensive, organic farming, contaminated land. Fundamentals of methods of selection of individual and average soil samples for different soil-climatic zones and soil inhomogeneities, technologies of growing crops, in conditions of different types of pollution of plots, closed structures. Estimation of land plots for construction, reclamation. Organization of the laboratory, express diagnostics of soil indicators. Selection and comparison of international and Ukrainian methods of analysis of soil particle size distribution, reaction of soil environment, organic matter, nutrients. Analyzes for laying lawns, ornamental crops.

**Soil risks in agricultural production.** Estimation of soils and lands is a quantitative characteristic of their potential productivity, a basis for qualitative and economic estimation of lands, formation of effective agricultural production. Based on the study of agrophysical, physicochemical and agrochemical indicators, the potential productivity of soil differences and land plots in general will be quantified, soil risks and soil crisis indicators will be identified, regardless of the nature and specific type of their use, namely highly profitable cultivation of specific crops. plantations, vegetable and niche crops, etc. Soil risk assessment will be carried out for different types of agriculture. enterprises and their size in relation to the most rational use (management) of land plots. Let's get acquainted with the assessment of the suitability of lands (soils) for the production of organic products, the risks of their introduction for agricultural production. Method of assessing the ecological and reclamation condition of irrigated lands. Methods for assessing soils and risks of agricultural production in the United States, FAO and Europe.

**Qualitative assessment of soils and lands.** The current ecological condition of land resources in Ukraine and the priority tasks for their reproduction are considered. A qualitative assessment of soils and strategies for their fertilization, taking into account scientific approaches. Soil quality monitoring and new directions of using soil monitoring results are provided. Methods of qualitative assessment of lands, grading of soils are given. The discipline acquaints with the national system of soil standardization in Ukraine. The purpose of studying the discipline is to master the basic principles of certification of soils and lands depending on their specialized use.

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 201 "AGRONOMY"  
educational program "SELECTION AND GENETICS OF AGRICULTURAL CROPS"**

Form of Training:	Licensed number of persons:
– Full-time EPP	20
– Part-time	10
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Agronomy

**The concept of training**

Graduates of this program master modern methods of identification of plant varieties, methods of molecular genetic research, scientific and legal principles of state registration of varieties and their rights, which will positively influence the decision on their employment and provide qualified personnel of the field of protection of plant protection rights. Preparation of masters in specialization is focused on the formation of students' knowledge, skills and practical skills in the scientific bases of selection and genetics of field crops, the organization and conduct of state scientific and technical examination of varieties and hybrids in Ukraine, theoretical foundations and organization of seed production, development of resource-saving technologies for cultivation crop and state control of varietal and sowing qualities of seeds for further growth and stabilization of volume Plant production in Ukraine.

**Educational and professional program of master's training**

**Areas of employment of graduates**

Research institutions NAAS of Ukraine, Ukrainian Institute of Plant Expertise, advanced agro-industrial companies, holdings and corporations, agricultural production enterprises of various forms of ownership, agricultural enterprises of different forms of ownership.

**Practical training**

Students undergo practical training in education and research farm NULES of Ukraine: Separated subdivision of NULES of Ukraine "Velykosnytsinske Education and Research Farm named after O. Muzychenka" and Separated subdivision of NULES of Ukraine "Agronomic Research Station", at the research institutes of NAAS and NAS of Ukraine: National Scientific Center "Institute of Agriculture of NAAS", THE V.M. Remeslo myronivka institute of wheat NAAS, Institute of Bioenergy Crops and Sugar Beet NAAS and Institute of Plant Physiology and Genetics NAS of Ukraine, research centers of the Ukrainian Institute for Plant Varieties Examination, enterprises of different forms of ownership for the cultivation, preparation and sale of pure-bred seeds and planting material.

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### Proposed Topics of Master's qualification Theses

1. Peculiarities of selection of maize initial material for breeding for cold resistance under the conditions of the Agronomic Research Station of NULES of Ukraine.
2. Features of breeding of soft winter wheat varieties universal type of IFPG.
3. The initial material of purple echinacea with a high level of decorative.
4. Improvement of haploid production technology in spring barley culture in vitro.
5. Mutational effect of artificial media components in microclonal reproduction of blackberry «Rubus eubatus Focke».
6. Vegetative hybridization in the Solanaceae family.
7. Characteristics of winter wheat collection specimens by economically valuable features.
8. Use of the world gene pool in winter wheat breeding.
- a. Biochemical and bioenergy evaluation of maize feedstock.
9. Use of apozygotic lines in sugar beet breeding.
10. Features of potato seed production by in vitro method.
11. Modification of the 5-enolpyruvylshikimate-3phosphate synthase (EPSPS) gene and creation of vectors to reduce the sensitivity of plants Zea mays., L. and Brassica napus., L. to phosphonomethylglycine.

### Curriculum of Master training in educational program “Selection and genetics of agricultural crops” (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Methodology of breeding experiment	6	exam
CC 2	Genetic resources of plants	5	exam
CC 3	Agrochemical service in crop production	5	exam
CC 4	Pedagogy and psychology	4	test
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 5	Special genetics of agricultural crops	8	exam
CC 6	Genetics immunity against diseases and pests	6	exam
CC 7	Special breeding of crops	4	exam
CC 8	State qualification examination with the basics of intellectual property	4	exam
CC 9	Market of varieties and seeds	4	exam
CC 10	DNA technology and biosafety	6	exam
CC 11	Production Practice	10	differentiated test
CC 12	Preparation and defense of master's qualification thesis	4	
<b>Total</b>		<b>46</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
OC 1.1	Adaptive plant breeding	4	exam
OC 1.2	Genetics of quantitative traits		exam
OC 1.3	Ecological genetics		exam



Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 2.1	Breeding and seed production of bioenergy crops	4	exam
OC 2.2	Breeding and seed production of vegetable, fruit and berry crops		exam
OC 2.3	Breeding and seed production of fodder crops		exam
OC 3.1	Seed certification and standardization	4	exam
OC 3.2	Formation of varietal resources		exam
OC 3.3	Inspection supervision and control		exam
OC 4.1	Technical support of genetic research	4	exam
OC 4.2	Cytology		exam
OC 4.3	Biochemistry in plant breeding		exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Methodology of breeding experiment.** The discipline is aimed at the formation of professional competencies necessary for innovation and implementation of modern research technologies in agronomy, using methods and techniques of genetic, biotechnological, breeding, laboratory, field, vegetation research. Methods of mathematical statistics used to evaluate and interpret the results of field, vegetation and laboratory experiments conducted during breeding and genetic experiment are presented. Using the results of the analysis in practice, the student must find optimal solutions and make recommendations for the creation and cultivation of varieties of crops depending on the specific conditions.

**Genetic resources of plants.** Tasks and role of plant biodiversity in ensuring sustainable development of crop production, national and global food security. Their creation and preservation. The main forms of conservation of plant genetic resources. In situ conservation - in natural ecosystems. Preservation of the local gene pool on farm - in farms with a traditional way of life. Ex situ preservation - in gene banks and on collection plantations. UN Convention on Plant Biodiversity. International Institute of Plant Genetic Resources, its functions. International Centers for Agricultural Research. Scientific and technical program of Ukraine "Genetic resources of plants", its purpose, main tasks. Establishment of the National Center for Plant Genetic Resources of Ukraine. System of genetic resources of plants of Ukraine. Theoretical and practical bases of introduction. Forms of introduction: naturalization, acclimatization, domestication. The doctrine of the source material, the centers of origin of cultivated plants. Methodological bases of formation, maintenance and use of collections of genetic resources of plants. Seed storage technology and its regeneration. Biological bases of preservation. The concept of source and donor traits. Genetic donors of valuable traits among wild plant species. Certification of plant gene pool samples. Inventory of collections. National catalog. Classifiers-reference books, their use for creation of characteristic databases of agricultural plants.

**Agrochemical service in crop production.** The purpose of theoretical study of the material and laboratory classes is the formation of a master's degree in "Agronomy" theoretical knowledge on agrochemical support and maintenance of agricultural enterprises, the formation of skills of monitoring and application of chemicals in the

technological processes of crop production. During the study of the discipline masters, acquire practical skills in controlling the production and use of mineral fertilizers, their transportation and application, the possibility of production and use of organic fertilizers and ameliorants, the peculiarities of the use of chemicals in precision farming. Much attention is paid to the study of technologies for storage and application of mineral fertilizers under extreme conditions of growing crops. Masters acquire knowledge in management and marketing in agrochemical service, the use of agrochemicals and services in the field of agricultural production service, control of soil condition and the results of the use of chemicals.

**Pedagogy and psychology.** The purpose of teaching the discipline is the formation of psychological and pedagogical competence of students in matters related to psychological and pedagogical features in the field of agronomy, equipping them with modern educational technologies, methods of creative search for future professionals; formation of interest and readiness for independent knowledge of the problems of didactics, theory and methods of vocational education. The main objectives of the discipline are to acquire practical skills of pedagogy and psychology, necessary for further activities in the field of agronomy, namely: rational planning and organization, the ability to demonstrate basic skills of pedagogical knowledge, generate new ideas, use knowledge of psychology and pedagogy in organizing production activities.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Special genetics of agricultural crops.** Planned scientific selection of crops is closely related to a special genetic form, which determines the basis of methods of breeding work. This is because all stages of breeding – obtaining the source material, selection of pairs and selections in breeding, methods and types of hybridization, ways to stabilize the variety and other sections are based on genetically regulated processes. Special genetics is the genetics of individual species and genera, it systematizes knowledge of genomic and karyological analysis, genetics of traits, mutagenesis, polyploidy, inbreeding and heterosis, population genetics (natural and varietal) and other issues of genetics of this species. The course includes genetic determination and mechanisms of inheritance of plant traits (cereals, legumes, cereals, and fodder, vegetables, and fruit crops). Genetic centers of origin, taxonomy and karyology of species. Genetics of morphological, physiological and biochemical traits. Features of reproductive systems, the presence of a polyploid series among species of the genus. Genetic mechanisms of plant resistance control against major pathogens and pests. The study of plant genetics in plants goes in two directions: the analysis of individual genetics and the study of population genetics.

**Genetics immunity against diseases and pests.** State study of the problem of immunity. Theories immunity. Immunity and stability. Passive and active immunity. The interaction of plants with pests. Types stability: vertical, horizontal. Tolerance. Genetic bases of stability of agricultural crops to pathogens. Theory Flora "gene to gene." Interaction resistance genes: adaptive interaction, epistasis, complementarity, interaction with genes modifiers. Genetics pathogenicity pathogens. The immunity of plants to pests. Relations between the plants with insects – antofiliya and fitofahiya. Mechanisms of immunity of plants to pests: antyksenoz, antibiosis, tolerance. Genetics of resistance to pests. Initial material for resistance against pathogens and pests. Sources and donors resistance against diseases. Bank of resistance genes against pathogens. Hybrid analysis: diagram crosses, analysis hybrids F1 and F2, statistical data processing hybrid analysis. Methods creating original material resistant to pathogens and pests. Assessment of breeding material for resistance to diseases and pests.

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**Special breeding of crops.** The discipline covers the main issues of special selection of crops grown in Ukraine: cereals (wheat, rye, barley, oats, triticale and corn), legumes (peas, soybeans), cereals (buckwheat, millet), technical (sugar beets), oilseeds (sunflower, rapeseed), spinning (flax), tubers (potatoes), etc. For each culture, general information about the origin and achievements, tasks and directions of selection, source material, models of varieties, selection methods (intraspecific hybridization and work with hybrid offspring, interspecific hybridization, methods and techniques of crosses, use of mutagenesis and polyploidy, methods and schemes of selection from mutant and polyploid populations), schemes of selection process and their methods and techniques, evaluation of selection material (productivity, length of vegetation period, product quality, etc.), selection technology of individual crops taking into account their biological and genetic features, as well as the existing gene pool.

**State qualification examination with the basics of intellectual property.** Discipline varieties of like studying intellectual property, which is excellent, uniform and stable and suitable for dissemination in Ukraine that can be used to meet the needs of society and not for distribution prohibited grounds of threat to life and health you people harm flora and fauna, the preservation of the environment. Knowledge of international and domestic legal provision to regulate actions in the field of plant variety rights, will practically apply the scheme applicable laws and regulations, provided the acquisition, protection and realization breeder non-property and property rights for a plant variety. Theoretical and practical course will become acquainted with advanced achievements of registration and implementation of plant variety rights in Ukraine and in member countries of the International Union for the Protection of New Varieties of Plants (UPOV) and the European Union (CPVO). Theoretical and practical course to learn the discipline will enable varietal diagnosis quantitative and qualitative characteristics of varieties – candidate of its resistance to stressful environmental factors determine the plasticity, adaptive varieties in the transformation of their economic and biological, consumer and intellectual values.

**Market of varieties and seeds.** The quality and cost of seeds largely determine the overall efficiency of crop production due to the relatively high share of value in the structure of costs for growing crops. Seed exports account for about 10% of world domestic markets. There are 71 countries exporting and 111 countries importing seeds, whose cash inflows and outflows for seeds amount to more than \$ 1 million. Currently, the Annual Variety List, published under the auspices of the Organization for Economic Cooperation and Development (OECD), includes about 45,000 varieties and hybrids representing 197 species. Therefore, there is a need for high-quality and rapid propagation of yielding and heterosis seeds and their sale in market conditions. The main task of the discipline is: training of specialists for independent work in agricultural enterprises, companies and firms that reproduce seed material, grow it, bring it to sowing condition, deal with its implementation, marketing, packaging, preparation of relevant documents, have their own plants and calibration lines , packaging and seed sales services.

**DNA technology and biosafety.** The subject of the discipline is molecular phenomena and processes that allow at the genetic level to identify, modify organisms, diagnose their genetic changes and purposefully transform the genome to create new high yielding, high-quality varieties and hybrids of crops. The discipline develops knowledge on the methodology of obtaining recombinant DNA, cloning of DNA fragments, creation of new genotypes of varieties, hybridization, transgenesis, gene identification, molecular diagnostics, study of genetic diversity and genotyping of varieties and hybrids using DNA markers. Along with the wide possibilities of DNA technologies, there is a threat of negative impact of biological factors on the population and the environment, the possibility of threats of biological origin associated with the development of modern biotechnology and the lack of a clear procedure for genetic engineering.

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**Optional components of EPP*****Free choice according to specialty***

**Adaptive plant breeding.** The main purpose of selection work is to achieve genetic progress to increase the productivity of a unit of crop area and improve product quality. Each new variety must combine a number of hereditary factors that control different biological and economic traits. Among them, a special place is occupied by traits that ensure the stability of yields and other valuable traits in changing environmental conditions. A sign of higher homeostatic variety is the ability to form a dense coenosis in adverse growing conditions. The discipline forms knowledge of the theoretical foundations of adaptive selection, mechanisms of plant adaptation (ontogenetic, morphoanatomical), ecological stability of plants. Features of plant adaptation to the main environmental factors (temperature, water stress, light, edaphic factors). The role of the source material in the selection for adaptability. Creation of genetic collections of adaptive traits. Creating a collection of marker genes.

**Genetics of quantitative traits.** The course provides knowledge of the scientific foundations of the theory of genetics of inheritance and selection of utilitarian breeding traits of cultivated plants. The main task is an in-depth theoretical and practical study of the theory of genetic improvement of cultivated plants on quantitative grounds. Having studied the discipline the student will know: statistical regularities of probability; dynamic processes of inheritance patterns; stochastics of the mutation process; genetic structure of populations; laws of change of genetic structure of populations and their determining factors; statistical characteristics of populations with continuous variation; inheritance; selection by quantitative characteristics, its mechanism and results; the influence of different crossing systems on the structure of populations, inbreeding and crossbreeding; genotypic and phenotypic correlations; how to use statistical reference books and reference tables.

**Ecological genetics.** The introduction into practice of varieties resistant to abiotic and biotic environmental factors is the most effective method of increasing the productivity of varieties. However, most varieties with high resistance were created without understanding the mechanisms of this resistance. One way to achieve an understanding of the mechanisms of plant stability is to accumulate fundamental knowledge about the genetics of plant defense mechanisms. The study of the genetics of physiological and biochemical mechanisms that ensure the morphological resistance of plants to stress and pathogens, methods of evaluation and creation of source material adaptable to extreme environmental conditions is the main task of the discipline. Therefore, the use in breeding for resistance to biotic stresses of the latest advances in genetic science concerning the relationship between plants and pathogens at both biochemical, genetic levels and at the level of the plant-host relationship with the pathogen in the environment is a priority to solve the problem of creating a comprehensive - immune-resistant varieties to diseases.

**Breeding and seed production of bioenergy crops.** Study of genetic, biotechnological and physiological-biochemical methods of creating new starting materials for selection of bioenergy crops (miscanthus, candlegrass, sugar sorghum, sugar and fodder beets, etc.). Features of selection of bioenergy crops for the production of different types of biofuels: liquid (bioethanol, biobutanol), gaseous (methane, synthesis gas) and solid (fuel pellets, briquettes, wood chips). Creation of competitive, highly productive, resistant to a complex of adverse environmental factors varieties and hybrids suitable for mechanized production technologies. Development of fundamentally new resource- and energy-saving technological processes and technologies for growing and harvesting bioenergy crops and their seeds, adapted to soil and climatic zones, in order to achieve maximum genetic potential of crop productivity and high reproduction rate of planting material.

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**Breeding and seed production of vegetable, fruit and berry crops.** The course provides knowledge on the methods of selection of vegetable, fruit and berry crops with the improvement of quality yields with the receipt of environmentally friendly products. Establishing optimal methods for obtaining the source material. Formation and development of selection programs for obtaining and introduction into production of improved varieties and hybrids. Identification and prompt search for the most economical way to transform the natural initial genotype into the desired one. Application of genetic methods in breeding practice to create new synthetic cultures. Obtaining in practice new varieties with signs of high anthropoadaptability. A study of the combination of high productivity and endurance of plants. Installation for fruit and vegetable crops to accelerate the rate of selection with greenhouses to accelerate the onset of fruiting seedlings of perennial breeds. Mastering the methods of intraspecific and remote hybridization. Ability to make schemes of arrangement of standards and grades in repetitions of selection nurseries and varietal tests. Mastering the organization and technology of seed production, varietal quality control of seeds and crops and documentation of varietal seeds. Solving the issue of advertising new varieties and hybrids for the implementation of varietal replacement of fruit and vegetable crops.

**Breeding and seed production of fodder crops.** Breeding and seed production of fodder crops is a set of methods for research and creation of new forms of fodder crops and maintenance of their seed production, based on modern advances in biological sciences, which allow purposeful research and forms with new features, study certain properties of new forms and give them new signs. Breeding and seed production of fodder crops is an integral part of traditional breeding and genetics, together they are able to raise the productivity of fodder crops and, thus, agriculture to a qualitatively new level. Therefore, a modern specialist must master all methods of agricultural research and effective selection of fodder crops and maintaining seed production of new varieties and hybrids. The discipline should provide students with a set of knowledge about the peculiarities of selection and seed production in perennial legumes and cereals, cereals and fodder roots. To train future specialists to plan and develop the selection process, to place breeding nurseries of forage crops, to use crop-specific methods, to conduct preliminary assessments and to use rapid methods and other measures to accelerate and effectively conduct selection research with forage crops.

**Seed certification and standardization.** The discipline provides disclosure of the essence of Seed Certification Schemes according to the requirements of the International Organization for Economic Cooperation and Development (OECD), which provides a set of procedures, methods and techniques to guarantee varietal and sowing qualities of seeds of all categories in the process of propagation, variety authenticity and varietal purity. The use of plant variety identification methods ensures the establishment of variety authenticity, degree of homogeneity and hybridity. Knowledge of the discipline will consolidate practical skills in the application of plant variety identification methods (morphological description, electrophoresis, DNA markers, PCR analysis, etc.) in varietal certification (field inspection and POST-control) and in subsequent morphological, biochemical, genetic certification of varieties, international varieties, commercial circulation of seeds in the mode of import-export. The breeder, the expert, the scientist and the seed producer can apply the acquired knowledge in the practical activity.

**Formation of varietal resources.** Tasks and role of varietal resources in ensuring sustainable development of crop production, national and food security. Their creation and preservation. World legislation and international genetic centers of plant resources. System of varietal genetic resources in Ukraine. Adaptation of domestic seed production to international schemes and procedures. Relationships between originators, producers and consumers of varietal resources. Analysis of the bank of varietal resources, the use of

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classifiers of directories and the available varietal range. Methods of plant variety identification. State registers of plant varieties and producers of seed and planting material.

**Inspection supervision and control.** State supervision (control) over the state of compliance with the requirements of the legislation in the field of seed production and nursery is carried out by the State Inspectorate of Agriculture of Ukraine and its territorial bodies. Within the discipline the procedures of planning and implementation of planned and unscheduled measures of state supervision (control) on checking the state of compliance of economic entities with the legislation in the field of seed and nursery, organizational measures to be carried out before inspections, general requirements for their implementation are studied. , as well as requirements for the design of materials based on the results of inspections.

**Technical support of genetic research.** The purpose of teaching the discipline of coverage of ideas about modern platforms for genetic analysis, basic technical means and platforms for the primary nucleotide sequence of genomes, fragment genetic analysis, modern devices for microscopy and visualization of molecular processes; provide practical skills of bioinformative analysis of sequencing data and genome analysis.

**Cytology.** The course gives an idea of the general laws of organization of cellular structures and intracellular processes, universal for all cells, the organization of regulatory mechanisms of the whole cell, knowledge of structural and functional organization of tissues and tissue homeostasis using modern physicochemical and histological research methods. Currently, cytology is a complex biological discipline that develops various aspects of the doctrine of the cell. The purpose of the discipline "Cytology" is to form students' ideas about the relationship between organism and cell at different levels of organization of living matter, the system of integration mechanisms that regulate the development and activity of cells in a multicellular organism; gaining knowledge about the histogenesis, structure and function of plant tissues; formation of ideas about the general principles of tissue organization and preservation of tissue homeostasis when the environment changes; determining the importance of the structural and functional level of tissue organization for understanding the basics of the organism.

**Biochemistry in plant breeding.** Biochemistry, or biological chemistry, is a science that studies the composition, structure, properties of substances of living nature, as well as their transformation in the process of life of living organisms in order to learn the molecular basis of life. The name of this science suggests that it is related to both biology and chemistry: biochemistry is chemistry because it studies the structure, composition, properties and transformations of substances, and biological because it studies only those substances that occur and are subject to transformation in wildlife. Depending on the approach to the study of living matter, biochemistry is divided into static, dynamic and functional. Static studies the chemical composition of organisms - composition, structure, quantitative content in certain biological objects. Dynamic studies the transformation of chemical compounds and interrelated energy transformations in the life of living organisms. Functional - clarifies the relationship between the structure of chemical compounds and the processes of their transformation on the one hand and the function of subcellular structures, specialized cells, tissues or organs that include these substances - on the other. The purpose of the discipline - to provide fundamental knowledge about the structure and properties of macromolecules that are part of plants, their chemical transformations and the importance of these transformations to understand the physicochemical basis of life, molecular mechanisms of heredity and adaptation of biochemical processes in organisms to changing environmental conditions; to form an understanding of the unity of metabolic processes in the body and their regulation at the molecular, cellular and organismal levels.

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 201 "AGRONOMY"  
educational program "AGROHIMSERVICE IN PRECISION  
AGRICULTURAL PRODUCTION"**

Form of Training:	Licensed number of persons:
– Full-time EPP	25
– Part-time	10
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Agronomy

**The concept of training**

The agrarian sector is the foundation of the national economy in Ukraine and the main consumer of personnel in the labor market. The competitiveness for domestic agricultural enterprises is determined by the international market through the innovation of agrotechnologies in crop production systems. Their basis is the introduction of modern agrochemical, agronomic and technological solutions based on the effective management of agrarian resources. Such technologies can be realized by experts in the field of Agrochemical Service for precision agriculture. Specialists in this field can carry out the following tasks of professional activity: development of technologies and use of tools of complex agrochemical monitoring, assessment of soil quality and field potential; efficient use of GIS technologies and remote sensing technologies, provision of differentiated fertilization and the use of mobile applications for effective management decisions for the rational use of agrarian resources.

**Educational and professional program of master's training**

**Areas of employment of graduates**

The industrial field of the crop production industry, agricultural enterprises, state institutions of soil fertility protection and agrochemical services of the crop industry, companies engaged in the sale and maintenance of equipment for precision agriculture.

Graduates can work in the system of regional branches of research institute "Ukrzemproekt", in the system of soil protection service on the positions of engineer-agrochemists; in the banking spheres at the positions of soil evaluation experts; in the system of quarantine services and customs control of Ukraine in positions related to the assessment of the quality of soils and the environmental state of the environment; in commercial and government agencies that carry agrochemical service agroenterprises in the conditions of precision agricultural production, conduct comprehensive agrochemical diagnostics and diagnostics of plant nutrition at the positions of managers- agrochemist, managers-promoters, agrochemists-analysts, plant nutrition consultants, specialists to provide services for precision farming.

**Practical training**

Students undergo practical training in leading agribusinesses: LCD "Agrilab", "IST AGRO", LCD "Biotech LTD", "Tak AGRO", "Agroregion", "Yatran", Mironivsky Hliboproduct,

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NAAN Research Institutes and NAS of Ukraine, educational and scientific laboratories of the NUBiP departments of Ukraine.

### Proposed Topics of Master's qualification Theses

1. Management of the level of nitrogen content in the soil for the cultivation of winter crops.
2. Remote monitoring of plant condition.
3. Geo identification of problem areas of soil fertility.
4. Geo identification of heterogeneous soil fertility areas.
5. Plant productivity management for differentiated fertilization.
6. Monitoring of soil fertility level in precision agroproduction.
7. Differentiated fertilization for cultivating crops.

### Curriculum of Master training in educational program “Agrohimservice in precision agricultural production” (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Technological provision for agrohimeservice	5	exam
CC 2	Spatial heterogeneity of soil cover	6	exam
CC 3	Agrochemical service in plant growing	8	exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Physiology and diagnostics of plant nutrition	9	exam
CC 5	Agrochemical soil monitoring	6	exam
CC 6	Remote monitoring of agrophytocenoses	6	exam
CC 7	GIS in agrochemical service	6	exam
CC 8	Differentiated application of agrochemical resources	6	exam
CC 9	Production Practice	10	differentiated test
CC 10	Preparation and defense of master's qualification thesis	4	
<b>Total</b>		<b>47</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
OC 1.1	Software solutions in agrochemical service	4	exam
OC 1.2	Information technology in plant nutrition		exam
OC 1.3	Digitization of agrochemical service		exam
OC 2.1	Logistics of fertilizer application	4	exam
OC 2.2	Intra-soil and foliar fertilization		exam
OC 2.3	Tactics of using liquid fertilizers		exam
OC 3.1	Nutrition strategies in the zone of risky agriculture	4	exam
OC 3.2	Fertigation and irrigation		exam
OC 3.3	Information technologies of moisture supply and plant nutrition		exam
OC 4.1	Fertilizer market potential	4	exam
OC 4.2	Potential risks of using counterfeit fertilizers		exam
OC 4.3	Fertilizers in precision agricultural production		exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Technological provision for agrohimeservice.** The purpose for theoretical and practical study in the discipline is the formation in masters of theoretical knowledge and practical skills in the organization of the main technological cycles agrohimeservice, effective and rational selection of technical means, the formation and synchronization of agricultural aggregates with the entire logistic scheme of application for agrochemical resources, ensuring the quality control of agrochemical techniques taking into account soil properties, biological characteristics of agricultural crops, physical and chemical processes in the interaction of agrochemical resources with soils and the surrounding environment. The ultimate aim of the discipline is to develop skills of future specialists in the successful completion of technological projects and charts for the technological delivery of techniques for the use of agrochemical resources.

**Spatial heterogeneity of soil cover.** The goal for studying theoretical material and laboratory course is the development the theoretical knowledge for the future specialists about the concept of soil heterogeneity, as well as practical skills for establishing the types and causes of heterogeneity of soil, soil properties, which can be managed and changed in the near future, the consequences of the heterogeneity of the soil cover in crop production.

**Agrochemical service in plant growing.** The purpose of theoretical study of material and laboratory studies is the formation of theoretical knowledge about the agrochemical support and service of agricultural enterprises, the formation of the skills in monitoring and application of chemical agents in the technological processes of obtaining crop production in the specialty "Agronomy". During the study of the discipline, the masters acquire practical skills in controlling the production and use of mineral fertilizers, their transportation and application, the possibilities of production and use of organic fertilizers and meliorants, and the specificity for the use of chemicals in precise agriculture. Much attention is paid to the study of the technologies of storage and introduction of mineral fertilizers under the extreme conditions of cultivating crops. Masters acquire knowledge in management and marketing in agrochemical service, the application of agrochemicals and services in the field of agricultural production, monitoring the state of soils and the results of the use of chemicals.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Physiology and diagnostics of plant nutrition.** The purpose for the study of theoretical material and the laboratory course of discipline is the formation for a future specialist of theoretical knowledge about the physiological processes of plant nutrition, methods and methods of its diagnostics (strategic, operational, soil, visual, biological, functional, etc.), as well as acquiring practical skills in planning, organization and realization of complex agrochemical diagnostics for crop nutrition, allocation of zones in deficit of macro-, meso- and microelements within the field, selection of the most optimal their methods and technical support for the diagnosis of various groups of agricultural crops, the use of modern tools in this area agrohimService, the practical skills to maintain

and maintain the functional activity of devices for various types of diagnosis of plant nutrition, development of professional documentation.

**Agrochemical soil monitoring.** For the study of the lecture and laboratory course of the discipline, future specialists form theoretical knowledge and practical skills in evaluating the soil fertility indices as a source of nutrients and a factor in the formation of productivity of agricultural crops, their heterogeneity, and the nature of distribution within a separate field. Studying and acquiring skills in the methods of planning and monitoring of soil conditions, namely: sampling methods, planning of selection routes, grid elements of sites and their area in accordance with the soil zones, microrelief, diversity of soil modifications, intensity of agricultural use, fertilizer systems; sampling requirements, timing, sample size, depth, coding and sample binding; preparation of samples for agrochemical analysis and planning and selection of methods and methods of laboratory analysis using domestic, international classical and innovative methods of determination of soil fertility indices; development of agrochemical cartograms on the basis of the obtained monitoring results and planning of potential productivity of crops, field potential, planned crop yields. The student acquires the ability to determine the critical, limiting factors within the field, to have knowledge of the optimal content and the ratio of nutrients, their effective use in accordance with the biological requirements of the culture in order to realize the genetic potential. Must be able to compile a map of differentiated mineral fertilizers, taking into account the forms of fertilizers, methods and terms of application, using the characteristics of weather conditions, soil indicators of the level of maintenance of macroelements.

**Remote monitoring of agrophytocenoses.** The discipline aims to form qualifying theoretical knowledge, methodological understandings and practical skills of agrochemical survey of vegetation, using various methods and means of remote sensing - mobile spectral analysis devices, ground sensor equipment, unmanned aerial vehicles (UAVs), satellites. The lecture course reveals methodical and methodological approaches to remote monitoring of agrochemical parameters (mineral nutrition of plants, some indicators of soil fertility, efficiency of application and action of fertilizers). Laboratory classes allow a master's student in practice to work out the whole algorithm of such surveys, learn to rationally interpret the data for practical use.

**GIS in agrochemical service.** Upon studying the lecture and practical course of the discipline, the future specialist will acquire theoretical knowledge about the possibilities and limitations of GIS in agrochemical service and all analytical processes associated with them, the importance of scale, projection and topology of the ability to visualize the world. The Master will master practical skills in obtaining geospatial data, defining the area of a polygon, constructing a buffer, raster and vector overlay, calculating landscapes, creating maps and using them. To perform these and other functions, you will learn how to work with the software: Manifolds GIS, Global Mapper, webportal Agrilab.

**Differentiated application of agrochemical resources.** This discipline is the final course of the educational program. Mastering it allows the student to acquire theoretical knowledge and practical skills to implement task maps, which are developed in accordance with the results of examination and comprehensive agrochemical diagnostics, in order to manage crop productivity taking into account intrafield variability of plant growing sites and optimize the use of consumables. The future specialist will acquire knowledge and skills in the selection and use of modern agricultural machinery, controlled by on-board computer and capable of differentiated agro-technical operations, as well as successfully upgrade existing equipment on farms. In addition, the specialist will be able to successfully use and provide professional services for the use of precision positioning devices (GPS receivers), technical systems to help detect field heterogeneity, automatic samplers, various sensors and measuring systems, harvesting machines with automatic harvesting, devices remote sensing of agricultural crops, detailed GIS maps, etc.), etc.

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**Optional components of EPP**  
***Free choice according to specialty***

**Software solutions in agrochemical service.** The purpose of the discipline is to provide students with the necessary knowledge and skills in the selection and adjustment of software (software), which allows to form a database for each field of the economy, analyze them, obtain information for decision-making with technological implementation. The task of the discipline is to form in students: understanding of the algorithm for creating and operating relevant software, the ability to create and maintain an electronic journal of fields, to form a database for analysis and forecasting decisions, to make timely and effective management decisions - from local to strategic format; practical skills of using up-to-date software that helps to carry out operational monitoring and tactical management of agricultural production, including assessment of plant condition during the growing season, detection of signs of nutrient deficiency, identification of various damages, phytosanitary condition of phytocenoses, etc.

**Information technology in plant nutrition.** The aim of the discipline is to provide students with the necessary knowledge and skills on the system of collecting, storing, processing data on providing plants of a particular culture with nutrients, compliance with the onset and passage of growth and development (stages of organogenesis), analysis and use of data for timely effective management and forecasting decisions. The task of the discipline is to form in students: the ability to use data from satellite and aboveground monitoring of phytocenoses, with their subsequent interpretation to assess the supply of nutrients to plants; make the right selection of data from operating and transactional systems; to conduct an objective analysis of data, with the formation of reliable conclusions on the basis of which technological decisions can be made in matters of plant nutrition.

**Digitization of agrochemical service.** The purpose of the discipline is to provide students with the necessary knowledge and skills in the use of digital technologies in the field of agrochemical services of agricultural production, to quickly obtain data on the basis of which reliable technological decisions can be made. The task of the discipline is to form in students: the ability to organize the collection of information directly in the field (weather data, soil conditions, plant condition, etc.) in digital format; skills of filling the database, storage, selection and analysis in digital format of information of the agrochemical service system; practical skills of using relevant tools in digital technologies (gadgets, devices); understanding the algorithm of selection and processing of information for decision making in agrochemical service.

**Fertilizer logistics.** The purpose of studying the discipline is to form in future professionals an understanding of organizational and logistical processes for fertilizers, based on knowledge of the mechanisms of transformation of compounds in soil containing nutrients, changes in plant needs in growth and development, causes and sequence of nutrient uptake. Masters will gain knowledge on the methodology of organizing the application of sharp types and forms of fertilizers in the most optimal ways, on the operation of different terms and ways to use them to optimize plant nutrition.

**Intra-soil and foliar fertilization.** The aim is to form in masters of theoretical knowledge and practical skills about the importance, tasks, methods and features of the organization of root, intrasoil and foliar fertilization. In the course of studying the discipline theoretical and practical attention is paid to innovative technologies of liquid mineral fertilizers by injection method and with the use of applicators-herbalists. Students learn the requirements for sprayers, selection of sprays and techniques for preparing working solutions. The result of the course is the ability of masters to develop technical and technological documentation and build a logistical scheme for root, intrasoil and foliar fertilization.

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**Tactics of using liquid fertilizers.** The purpose of studying the discipline is to form in future specialists an understanding of the benefits and features of the use of liquid fertilizers, the chemistry of the interaction of liquid fertilizers with the soil and in solutions or suspensions. Masters will gain skills in the organization of the logistics chain from procurement to application to crops in accordance with the phases of growth and development (BBCH), learn the ways of possible loss of nutrients and ways to overcome them. In addition, they study and select the best ways to apply them, taking into account the utilization factors of batteries and the economic factor of the use process.

**Nutrition strategies in the area of risky agriculture.** The discipline involves the formation of masters' understanding of the processes, their intensity in soils and plants with optimal provision of moisture and its deficit. In addition, students will gain practical skills in the use of technologies of effective natural moisture, soil moisture conservation and its rational use in the growth and development of agricultural plants. In the process of training masters will gain knowledge on the organization of various methods of artificial optimization of moisture supply of plants, their functionality and joint use of mineral fertilizers with irrigation water, taking into account the biological and varietal needs of crops.

**Fertigation and irrigation.** The purpose of studying the discipline is to form in masters an understanding of the processes that occur in soils and plants with changes in the conditions of moisture and nutrition of plants compared to bogara. In addition, students will gain knowledge on crop productivity management through mastering the characteristics of water consumption in the main critical phases of their growth and development and providing them with moisture, nutrients in the most efficient ways. Masters will gain skills in creating fertilizer solutions, managing schemes for their supply to irrigation machines and systems in terms of required doses and ratios depending on the biological needs of crops and mastering techniques to maintain soil fertility in the planned range.

**Information technologies of moisture supply and plant nutrition.** The aim of the discipline is to form in masters an understanding of the patterns of distribution and differentiation of soil fertility in the wetland and beyond, which have developed under the influence of irrigation, fertilizers and technologies for growing crops in general, mechanisms of plant productivity in regulated moisture. Masters will gain skills in collecting, storing, processing data on technologies of rational moisture supply and integrated control over irrigation water consumption, intensity and frequency of watering, application of fertilizers and pesticides. In addition, some modules are aimed at developing the ability to use innovative tools to control sprinklers (remote control technologies for irrigation parameters, accurate control of irrigation facilities, etc.).

**Fertilizer market potential.** The purpose of the discipline is to provide students with theoretical knowledge and practical skills on the main trends of the fertilizer market in Ukraine and the world, trends, characteristics of fertilizer market capacity, its segmentation and structuring, dynamics of fertilizer production, major fertilizer market operators, competitiveness, market risks, features of pricing and consumption of fertilizers in Ukraine.

**Potential risks of using counterfeit fertilizers.** The aim of the course is to provide students with theoretical knowledge and practical skills on possible areas and methods of falsification of fertilizers, as well as the main risks associated with the use of such fertilizers.

**Fertilizers in precision agricultural production.** The aim of the discipline is to provide students with theoretical knowledge and practical skills on the quality requirements of fertilizers suitable for precision agriculture, the main characteristics of fertilizers, range of fertilizers, selection of forms, methods and timing of their application in precision technology.

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 203 "HORTICULTURE AND VITICULTURE"  
educational program "HORTICULTURE AND VITICULTURE"**

Form of Training:	Licensed number of persons:
– Full-time EPP	45
– Part-time	30
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Horticulture and Viticulture

**The concept of training**

Training of master's degree students in specialty is oriented at modern and perspective directions of development in horticulture and viticulture. Training of master degree students on specialty foresees the deep specialized training in the sphere of fruit-growing, vegetable-growing in the opened and protected soil. Such specialists, after acquiring special abilities and knowledge of innovative character in this sphere are able to satisfy modern requirements of the society in assortment and production of necessary amount of high-quality fruits and vegetables for internal consumption and to the export, capable to organize and to ensure use of the most progressive modern technologies, both in scientific researches and production.

A graduate in this specialty theoretically and practically trained, has knowledges and skills of modern technologies in the field of horticulture and viticulture.

**Educational and professional program of master's training**

**Areas of employment of graduates**

Agricultural enterprises of different ownership, farms, greenhouse complexes, structures engaged in landscape gardening, delivery of equipment, seeds, planting material, crop protection chemicals and materials for orchards, vineyards, greenhouses and research institutions.

**Practical training**

Students undergo practical training in educational farms of the NULESU: "Agronomy Research Station", "Velika Snitinka Training and Research Farmstead named after O.V. Muzychenko" as well as advanced agricultural enterprises of different ownership forms, University Training Lab "Fruit and Vegetable Garden", Research Institutions of Academy of Agricultural Sciences and National Academy of Sciences of Ukraine, State Pomology and Ampelography Inspections.

**Proposed Topics of Master's qualification Theses**

1. The selection of varieties for establishment intensive orchards and vineyards by studying their compliance with the requirements of modern horticulture.
  2. Analysis of market prospects and growing of niche horticultural crops.
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3. Improving rapid technological elements of growing fruits, small fruits, nuts, and vines in nurseries.
4. Rationale and study the stability of varieties to adverse environmental factors.
5. Research reasonable selection of varieties (heterosis or hybrid) different types of vegetables in order to highlight the most suitable for growing conditions in certain areas.
6. Research effective elements of technology of cultivation of vegetables, including effect of sowing (planting seedlings, bulbs, tubers, etc.), methods of preparation of seeds and planting material, methods of sowing (planting), density and forming plants, methods of irrigation, the application of plant growth regulators, biological products, etc. to obtain high yields and environmentally-friendly products .
7. Learning new types of vegetables in order to introduce them into production for different areas of use.
8. Improving the technology of growing vegetables in greenhouses.
9. The use of new technologies in greenhouse horticulture.
10. Improve elements of technology of cultivation of edible mushrooms.

**Curriculum of Master training  
in educational program “Horticulture and Viticulture”  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Agribusiness and marketing in gardening, horticulture and viticulture	5	exam
CC 2	Methodology and organization of scientific research on the basics of intellectual property	5	exam
CC 3	Quality and logistics for storage, processing of fruit and vegetables	4	exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Sustainable fruit production	10	exam
CC 5	Niche fruits	7	exam
CC 6	Uncommon vegetable and exotic plants in open and closed ground	10	exam
CC 7	Post harvest handling of fruits, vegetables and grapes	5	exam
CC 8	Floriculture in open and closed ground	6	exam
CC 9	Production Practice	10	differentiated test
CC 10	Preparation and defense of master's qualification thesis	4	
<b>Total</b>		<b>52</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
OC 1.1	Organic fruit production	4	exam
OC 1.2	Production and certification of planting material		exam
OC 1.3	Special varietal science		exam
OC 2.1	Hydroponics	4	exam
OC 2.2	Advanced indoor technologies		exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 2.3	Ornamental indoor plants		exam
OC 3.1	Medicinal gardening	4	exam
OC 3.2	Mycology and mycorrhiza		exam
OC 3.3	Nut growing		exam
OC 4.1	Ampelography and selection of grapes	4	exam
OC 4.2	Programming and forecasting of vegetable crops		exam
OC 4.3	Organic vegetable-growing in field terms and protected cultivated		exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

##### **Agribusiness and Marketing in gardening, horticulture and viticulture.**

Discipline is dedicated to business and marketing strategy on the fruit and vegetable growing market and consists of three modules. The first module examines the theoretical and practical aspects of commercial activities on the fruit and vegetable market. The methodological and practical issues of marketing software business activities of the subjects on the fruit and vegetable market are studying. The commercial activities in the fruit and vegetable sector envisage a chain of transactions such as the rationale usage for resources for the production of each product, the choice of distribution channels, consumers and the establishment of economic links between them, monitoring the implementation of treaty obligations, organizing the sale of fruit and vegetable production and its stimulation. The second module considers the features of the vegetable production's consumption in Ukraine and in the world, the perspectives and trends on the consumer market. The third module considers the commercial strategy for businesses to improve production efficiency and competitiveness on the market. On the laboratory lessons the masters are acquainting with the development of a business plan as a specific planning document, which represents the organizational and financial income for the production of certain goods and services. The production of the main and new kinds of fruits and vegetables by SWOT-analysis as the basis for creating marketing strategies are analyzing.

**Methodology and organization of research with the principles of intellectual property.** The aim of the discipline is formation of the system of knowledge in methodology, theory of method and research process, methodical support of scientific and research activity at the stages of preparation of a Master paper, formation of the ability to organize research of a specific issue using the whole complex of the traditional methods of research including general and special methods. The main task of the theoretical part of the course is introduction to students the current concepts of research creation, the principles of methodology of scientific perception and methods of research. The main task of the practical part is the development of self-education ability, mastering skills of formation and application of perceived methodological position of research. In case of mastering the course students have to improve their skills of search, assortment and processing of scientific information, accurate formulation of a problem, aim, task, object, subject, methods of research. Introduction to students the principles of intellectual property

and direction of them to gain knowledge and skills concerning registration of rights of ownership, their protection, commercialization, estimation and management are envisaged.

**Quality and logistics at the storage, processing of fruits and vegetables.** The purpose of the discipline develops knowledge, skills in the future specialists in drawing up logistic schemes during transportation, storage and processing of fruits and vegetables, identification of dangerous factors, critical control points at all stages of their promotion through the logistics chain, that can be affect on the quality and safety of fresh or processed fruit and vegetable products in accordance with the HACCP system. The discipline studies a set of factors that will ensure the receipt of quality fresh and processed fruit and vegetable products, transport logistics, effective, reasonable regimes, ways of short or long-term storage of fruits and vegetables, optimal ways of their processing with minimal losses in quantity and quality, rules of control of all technological operations with storage and processing of fresh and processed fruits and vegetables to guarantee their safety for finish consumer.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE** **Compulsory components of EPP**

**Sustainable fruit production.** Course is an up-to-date training course that will provide a base of knowledge of the principles and practices of sustainable horticulture management systems in different regions of the world. The goal of sustainable horticulture is to meet the needs of present generations for fruits (while maintaining the sustainable balance of economic, social and environmental conditions) without jeopardizing the ability of future generations to meet their own needs. The course will also concentrate how climate change will impact on the future of regional fruit production, and how Ukrainian farmers will have to adapt horticultural management system with decreasing water availability, continuing soil degradation, and destabilization weather patterns all in the most cost effective manner of fruit production. Real-world application project will allow students to implement their newly acquired practical knowledge.

**Niche fruits.** Features and importance of rare fruit crops for modern horticulture. Systematics and nomenclature fruit plants. Origin and value of niche fruits. Biological features and biochemical composition of fruits. Assortment niche fruits. Features of reproduction, agricultural technology, harvesting, and fruit processing. Pome crops (quince, chokeberry, hawthorn, Japanese quince, mountain ash, nashi, medlar, service berry, etc.). Stone crops (Cornelian cherry, jujube, cranberrybush, elder, bird cherry, black apricot, Nanking cherry, etc.). Small fruit crops (pawpaw, kiwi and hardy kiwis, honeysuckle, magnolia vine, blueberry, seabuckthorn, blackberries, persimmons, barberry, cranberries, golden currants, etc.). Walnuts (precocious walnut with lateral fruiting, hazelnut, almond, chestnut, other walnut species).

**Uncommon vegetable and exotic plants in open and closed ground.** Important place in the diversification of nutrition is given not only the main vegetable plants, traditional for domestic consumers, but also widespread, exotic. The discipline builds on the future specialists knowledge and skills in the technology of cultivation of widespread crops. As a result of studying the discipline, the student should know the types of low-prevalent vegetable plants, their economic and biological characteristics, physiology of resistance to environmental factors, modern technologies of growing high yields of environmentally safe products.

**Post harvest handling of fruits, vegetables and grapes.** The Ukraine systems for marketing fresh vegetables under present-day conditions are complex, fragmented and dynamic. Demands for high-quality produce are continuing to increase now. In schemes supply of vegetables from field to table is of great importance postharvest technologies.

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The topics of our lectures are logical base of harvesting vegetables crops. The great importance are the methods of determining quality. The factors that influence on the quality are varieties, timing and method of harvesting, post-harvest technological methods of preparation. The definition of terms ripening vegetables. The biochemical changes during ripening and postharvest preparing vegetables. Under considering of field vegetables are shown the technology of crops harvesting for cabbage, carrot, table beet, parsley, selery, onion, tomato, sweet pepper, egg-plant, cucumber, and so on. On the cours lectures is present various aspects of postharvest stages of technology - harvest, load into field bins, trailers, transport, unload, cure, wash, sort and grade, size, cool, pack, cold storage and load into transport vehicles. Standards requirements for post-harvest technology training and vegetables are presented.

**Floriculture in open and closed ground.** We study history of floriculture open and closed ground, current floriculture trends in Ukraine and in the world. Types of flower and ornamental plants suitable for cultivation in the open and closed ground, their economic and biological characteristics. Requirements flowering plants to micro-climatic conditions in greenhouses. Cultivation techniques of major industrial flower crops on soil and artificial substrates. Reproduction methods of flowering and decorative foliage plants. Preying and pots culture of floral ornamentals. The use of growth regulators to improve the decorative flowers. Modern methods of pest and disease control flower crops. Standards for fresh and cut flower production. Ways to prolong life of cut flowers.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Organic fruit production.** The discipline reveals the issues of organic fruit production, the level of world development of organic production and its prospects for Ukraine. The basic technologies of growing organic products that provide environmental security and meet international quality standards are presented. Leaders among organic consumption countries are listed. The most common logos of the European, American and Japanese certification of organic products are presented.

**Production and certification of planting material.** The discipline studies the legal framework and systems of production of certified healthy planting material of fruit and berry crops, as well as new intensive profitable technologies for growing seedlings of grain, stone, nut and berry crops based on modern scientific achievements in Ukraine and the world.

**Special varietal science.** Theoretical and practical bases of features of cultivation of grades of fruit cultures on organic technology. Biological and production properties of fruit crop varieties, methods of their selection.

**Hydroponics.** Now in some countries with a high level of the greenhouse's industries, the cultivation of vegetable crops on artificial substrates is widely represented, as a nutrient flowing water culture with a high degree of automation and intensification of all production processes with energy-saving technologies. This necessitated the introduction of a special discipline in the list of disciplines of the master's degree. The history and stages of hydroponics development, methods and varieties, hydroponic substrates, solutions, low-volume hydroponics, hydroponic technologies, equipment and devices for them are studied in this discipline.

**Advanced indoor technologies.** In-depth study of the closed ground industry. Modern developments, designs, methods and materials, unknown or little known in domestic greenhouses.

**Ornamental indoor plants.** Species composition of ornamental indoor products and prospects for its cultivation. Requirements of ornamental plants to environmental

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conditions and methods of its regulation. Biological control over the condition of plantations and management of plant growth and development.

**Medicinal gardening.** Biologically active substances of garden plants, their importance in therapeutic and curative nutrition. Nutraceuticals and parapharmaceuticals. Fundamentals of modern human nutrition.

**Mycology and mycorrhization.** Study of cultural and morphological properties of mycelial colonies of edible fungi as an object of future cultivation. Features of the symbiosis of cultivated plants and fungi. The effectiveness of the use of mycorrhiza to increase the resistance of cultivated plants to adverse abiotic factors.

**Nut growing.** Modern technologies for growing walnuts, hazelnuts, almonds, pecans and pistachios. Theoretical and practical bases of nut cultivation. The importance of nuts as superfoods in human nutrition.

**Ampelography and selection of grapes.** Methodology of description and identification of grape varieties and rootstocks using descriptors. Biological and production properties of table and technical varieties of Ukraine and the world. Genetic basis of new disease-resistant and pest-resistant grape varieties and rootstocks.

**Programming and forecasting of vegetable crops.** Modeling of the system "vegetable culture - soil - weather - climate - yield". Programming a certain level of yield of vegetable crops, with the receipt of products that meet sanitary standards.

**Organic vegetable-growing in field terms and protected cultivated.** The situation on world food markets shows the increasing consumer interest in healthy nutrition and with the direct contribution to the preservation of the natural environment. Therefore, meet the growing demand for organic products continues to be one of the strategic directions of development of agriculture. In a course from the study of discipline the «Organic production of green-stuffs» questions light up from the study of bases of receipt ecologically of safe food, maintainance of fertility of soil and protecting stuffs from contamination and токсикації soils. Organic agriculture - the production system that supports the health of soils, ecosystems and people. It depends on ecological processes, biological diversity and natural cycles that are specific to local conditions, while don't use of resources that cause adverse effects. Organic agriculture combines tradition, innovation and science to improve the environment and promote fair relationships and adequate standard of living for this understanding. Organic productions now is popular kind of technologies. But there are any university in Ukraine that provide the students for the such kinds as organic horticulture. Because of it this discipline was introduced to the program of our department. This course is studied the choice of plaice for organic technologies, certifications schemes, methods of plant's depend for the pest, diseases and weeds in organic Horticulture.

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## **FACULTY OF PLANT PROTECTION, BIOTECHNOLOGY AND ECOLOGY**

**Dean** - doctor in agricultural sciences, professor, Y.V. Kolomiets

Tel.: (044) 527-86-99

E-mail: plantprotect\_dean@nubip.edu.ua

Location: Building № 4, Room 42

Faculty organizes and coordinates educational process of master training in educational program within specialties:

### **Specialty 101 "Ecology"**

#### ***Educational programs "Ecology and environmental protection"***

Guarantor of the educational and professional program – Doctor of Biological Sciences, Professor V. Gaichenko.

#### ***Educational programs "Ecological control and audit"***

Guarantor of the educational and professional program – Doctor of Agricultural Sciences, Professor V. Chaika.

Department in charge of graduate training:

#### **Department of Agricultural Sphere Ecology and Ecological Control**

Tel.: (044) 527-81-95

E-mail: el.naumovskaya@gmail.com

Head of the department – Candidate of Agricultural Sciences, Associate Professor O.I. Naumovska

### **Specialty 162 "Biotechnology and Bioengineering"**

#### ***Educational program "Environmental biotechnology and bioenergetics"***

Guarantor of the educational and professional program – Doctor of Agricultural Sciences, Professor M. Lisovyy.

#### **Department of Ecobiotechnologies and Biodiversity**

Tel.: (044) 527-85-17

E-mail: eko\_bio@nubip.edu.ua

Head of the Department – Candidate of Biological Sciences O. Y. Kvasko

#### **Department of Physiology, Plant Biochemistry and Bioenergetics**

Tel.: (044) 527-89-66,

E-mail: physiol.biochem2021@gmail.com

Head of the Department – Doctor of Biological Sciences, Senior Research S. V. Prylutska

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## **Specialty 202 "Plant Protection and Plant Quarantine"**

### ***Educational program "Plant Protection"***

Guarantor of the educational and professional program – Doctor of Agricultural Sciences, Professor, academician of the NAAS of Ukraine M. Dolya.

### ***Educational program "Quarantine of Plants"***

Guarantor of the educational and professional program – Candidate of Agricultural Sciences, Associate Professor O. Sykalo.

Departments in charge of graduate training:

#### **Department of Integrated Protection and Plant Quarantine**

Tel.: 527-82-12

E-mail: kaf.izkr@gmail.com

Head of the department – doctor in agricultural sciences, professor, academician of the NAAS of Ukraine M.M. Dolya

#### **Department of Entomology named after Prof. M.P. Diadechko**

Tel.: (044) 527-89-78

E-mail: entomologia@ukr.net

Head of the department – PhD in Agricultural Sciences, Associate professor, Y.O. Likar

#### **Department of Phytopathology named after Academician V.F. Peresyupkin**

Tel.: (044) 527-82-11

E-mail: phytopath\_Peresyupkin@ukr.net

Head of the department — PhD in Agricultural Sciences, Associate professor D. Gentosh

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**Training of masters of sciences  
in branch of knowledge "Natural sciences"  
in specialty 101 "ECOLOGY"  
educational program "ECOLOGY AND ENVIRONMENTAL PROTECTION"**

Form of Training:	Licensed number of persons:
– Full-time	50
– Part-time	50
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Qualification	Master of Ecology

**The concept of training**

The graded training of ecologists is realized through the continuous, integrated programs of basic and specific directions and the direction of national administration, including those which are adapted to the level of better world analogues, to the joint or simultaneous training at the universities-partners by means of integration into education and scientific complexes or international university consortiums and consists in the complete higher education qualification obtaining – Ecology Master, Academic (under the basic direction), Standardization, Certification and Quality Specialists, Environmental Management Experts (under specific directions) and Public Officer (under national administration direction).

Creating the Master programs the next possibilities were taken into account: ecological erudition and provision of general ecological constituent training of all professionally interested; representation in education process the social and ecological order for stable development; availability of favorable environment for integration of education, sciences, innovations, academic education informational support; valedictorian competency formation in formation of concepts, strategies, policies and programs of socio-economical and environmentally safe development and conservancy of nature for optimization of life and environment quality indicator on the basis of ecologically oriented administration decisions by means of improvement of education and scientific researches quality; performance assurance of the mechanisms of ecological policy and management on the global, national, regional and local levels.

**Areas of employment of graduates**

The activities of graduates of the master's program are related to the organization, provision, implementation and compliance with environmental control in the agricultural sector - monitoring, audit, certification, examination, to manage socio-economic and environmental development of agricultural areas and enterprises.

**Practical training**

Practical training of specialists is carried out in research farms of the National University of Life and Environmental Sciences of Ukraine: Ecological Inspectorate (regions and metropolitan district), Ministry of Environmental Protection and Natural Resources (Kyiv), Institute of Agroecology and Nature Management NAAS (Kyiv), Chornobyl - ecological biosphere reserve (Kyiv region, Ivankiv village), Drevlyansky Nature Reserve (Zhytomyr region, Narodychi village), BioNorma Group (Kyiv), Uzhansky National Nature Park (Zakarpattia region, Velyky Berezhny village).

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### Proposed Topics of Master's qualification Thesis

1. Beta diversity of aquatic phytocenosis.
2. The influence of abiotic factors on the accumulation of nitrate nitrogen by plants (for example, *Allium cepa*).
3. Ecotoxicological assessment of nanoagrochemicals on the effect on soil biological activity.
4. Identification of the main water and environmental problems on the example of the Upper Dnieper sub-basin of Ukraine.
5. Estimation of anthropogenic load on the territory of Nosivka by the method of bioindication.

### Curriculum of Master training in educational program "Ecology and Environment Protection" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Modern concepts of nature management	4	exam
CC 2	Methodology and organization of scientific research	4	exam
CC 3	Sustainable development strategy	4	exam
CC 4	Business foreign language	4	exam
CC 5	Environmental legislation	4	exam
<b>Total</b>		<b>20</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6	Civil defense	4	exam
CC 7	Environmental toxicology	5	
CC 8	Environmental control and audit	5	exam
CC 9	Environmental management	5	exam
CC 10	Environmental standardization and certification	5	exam
CC 11	Agricultural radioecology	4	exam
CC 12	System analysis of the environment	4	exam
CC 13	Experimental radioecology	4	exam
CC 14	Production Practice	8	differential credit
CC 15	Preparation and defense of master's qualification thesis	2	protection of work
<b>Total</b>		<b>46</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Ecological control and environmental protection"</i>			
OC 1.1	Agroecology	4	exam
OC 1.2	Environmental Impact Assessment	4	exam
OC 1.3	Agro-ecological control and management (monitoring, certification, management, inspection)	4	exam
OC 1.4	Global environmental problems	4	exam
<b>Total</b>		<b>16</b>	
<i>Optional Block 2. "Radioecology and radiobiology"</i>			
OC 2.1	Assessment of radiation risks for humans and the	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
	environment		
OC 2.2	Radiation hygiene	4	exam
OC 2.3	Modern methods in radiation research	4	exam
OC 2.4	Radiation biochemistry	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Modern concepts of nature management.** Form the knowledge about the environmentally safe state of the environment, which is provided by the warning, prevention of negative influences on the deterioration of the ecological situation and the emergence of danger to human health, the ability to determine the types of environmental safety by territorial features (global, international, national, national, regional, local), for methods of providing - technogenic-ecological (radioecological, socioecological, economic-ecological and natural safety), according to objects of protection - environmental safety of the surrounding grassland and its components, ecological safety of society and man; the skills of developing and implementing modern environmental concepts aimed at protecting the environment and the health of citizens. Optimization of nature use. Form knowledge about the conditions of a balanced interaction of human society with all natural biocenoses of the biosphere. Provides skills and skills aimed at achieving an effective economic result and maximizing the economic effect of minimizing damage to the natural environment, consumption of natural resources and their reproduction, and protecting the environment from pollution and destruction.

**Methodology and organization of scientific research.** The discipline creates in students a representation of self-creative, scientific thinking and develops the skills of scientific activity, promotes mastery of the latest environmental research methods allowing obtaining the quantitative and qualitative data needed for overall ecological characteristic of objects, processes in the environment leading to the right choice of technology, organizational and administrative decisions, ability to be oriented by the laws and regulations and clearly generate evidence-based conclusions.

**Sustainable development strategy.** The discipline generates knowledge of the principles and strategies of sustainable development as a harmonious process that ensures sustainable economic convergence, promotes environmental ecological culture - the preservation of natural resources, ensures the Biosphere space and environmental safety meeting the needs of human life. Learns provisions of practical implementation mechanisms, coordination and harmonization of social, economic and environmental strands of the development of sustainable society in the country, organizes plans and schedules of stages of sustainable development. Promotes mastery and skills of monitoring the indicators of sustainable development, identifies environmental risks and hazards for human development and sustainable development, promotes the use of international agreements and documents related to sustainable development, performance of plans and programs (region, city, town) in the transition to sustainable development in Ukraine and other countries in transition.

**Business foreign language.** The general aim of the program of teaching of foreign language for the professional purpose is formation students' professional linguistic competencies that will contribute to their efficient operating in cultural variety of training

and professional environment. The methods of search of new information in another language sources, linguistic methods of analytical study of another language sources are learned. Students study published original literature in another language and increase their lexical and grammatical skills. Methods and linguistic peculiarities of annotation and synopsis of another language sources, the principles of translation of professional oriented another language sources are studied.

**Environmental legislation.** Studies the system of legal norms and principles that regulate and protect public relations for the protection of the natural environment and the rational use of natural resources (environmental relations).

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Civil defense.** The discipline studies the functions and tasks of a unified state system of prevention and emergency response, protection of subjects of economic activity, provides practical skills for the protection of subjects of economic activity and their surrounding area.

**Environmental toxicology.** Environmental toxicology is an integrated science that is directly related to environmental protection, the overall ecology and toxicology, based on the use of advances in advanced technologies for preventing and counteracting the effects of harmful substances on biological objects of natural ecosystems. Ecological toxicology studies ecological aspects of toxicokinetic, toxicodynamic, toxicometry, reactions of biological systems to poisons, assessment of risk and harmfulness of toxins in the environment, as well as methods and technologies for preventing poisoning and detoxification of poisons in the environment.

**Environmental control and audit.** The discipline examines features of monitoring systems (observations) natural ecosystems, agricultural lands, urban areas and the formation of agroecological knowledge of database, instructional techniques of quality management of ecosystems, methods for optimal decision-making in the field of management of development of the agro sphere based on environmental laws, allows students-environmentalists acquiring knowledge and skills in the collection, analysis and processing systems, generalized, comprehensive information on the qualitative assessment of the environment and its documentary describing the natural, environmental, social, economic, energy, man-made characteristics of objects of environmental performance, territories, territorial-production complexes and groups, as well as commercial facilities for various purposes, forms the skills of development of evidence-based recommendations for the adoption of environmentally-oriented management solutions.

**Ecological management.** Environmental Management examines managerial relationships in an institution ensuring its sustainable development, environmental protection, safety of human life, sustainable use of natural resources and environmental safety of the institution and its activity aimed to the implementation of environmental objectives and programs of environmental impact, and creates a knowledge of environmental strategy of social development, management of natural resources and environment-related activity, which are determined by biological and socio-economic characteristics of enterprises, strategic goals of the society and allow the enterprises to survive and achieve their goals in the long run. Environmental audit is a management tool which examines the effectiveness of management in preserving the environment and maintaining competitiveness through ecological production, creates knowledge of systematization, documentation, frequency of objective evaluation of conformity of environmental management, operation of equipment and its conformity with environmental objectives, creates the ability and skills for assessment of environmental regulations and environmental policies of the company.

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**Environmental standardization and certification.** The discipline examines the system of mandatory functional and environmental requirements for products, technologies, management, is aimed to improving their environmental performance and implementing the system-wide identification for establishing compliance and certification. Provides the ability and skills in management, preparation and development of documents certifying conformity of environmental management of the enterprise to the requirements of standards and additional regulatory documents. Generates knowledge of basic provisions and terminology of the state control on the environment, the current state of the environment in Ukraine and Europe, environmental regulation of control parameters of the environment, methods and means of control of parameters of the environmental objects, transboundary pollution issues, accreditation of laboratories, using interlaboratory comparative trials.

**Agricultural Radioecology.** The discipline learns concentration and migration of radio nuclides in environmental objects of environment and agricultural production, agricultural environment and their effects on plants, animals and agro-ecosystems as a whole. Generates knowledge of designing the principles for the development of agriculture in the contaminated territories, complex protective measures for ensuring production of agricultural products and raw materials meeting radiological standards, regulations, requirements.

**System analysis of the environment.** Investigates the general engineering training of specialists in the field of complex environmental systems analysis as the basis for studying professionally oriented disciplines and providing theoretical knowledge and practical skills in system analysis in a sufficient amount for professional specialization.

**Experimental radioecology.** The sources of ionizing radiation in the environment, migration of radioactive substances in different ecosystems, features of physico-chemical forms of radionuclides and the assessment of the impact on the environment and the risks associated with radioactive contamination are studied in detail. Forming skills and abilities of conducting radioecological research using radioactive isotopes, radiochemical separation methods and modern measurement methods.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### ***Optional Block 1 "Ecological control and environmental protection"***

**Agroecology.** Developing the knowledge of the components and importance of the of agro ecology for the development of agro sphere and society, new approaches and methods of ecological safety of agricultural production, ecological agriculture methods, tools of performance and rehabilitation of modern agricultural landscapes, and ensuring the production of environmentally safe products, the main characteristics of the structure, function and types of modern agro-ecosystems, identifying, predicting and simulating the causes and consequences of destabilization, changes of energy and stamina, factors and prospects of stabilization, capturing the strategic direction of the agro sphere features of alternative agriculture, biotechnology and modern agriculture in the agro industrial complex in the world and in Ukraine.

**Environmental Impact Assessment.** Provides knowledge about the normative and legislative basis of ecological-expert activity, general requirements for carrying out ecological examination, peculiarities of conducting geoecological expertise as a new scientific and practical type of activity for estimating the mechanism of co-adaptation of natural and economic subsystems, procedures and methods of geoecological expertise; students acquire the skills: to conduct an ecological examination of technologies, raw materials and products.

**Agro-ecological control and management (monitoring, certification, management, inspection).** The discipline examines features of monitoring systems

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(observations) natural ecosystems, agricultural lands, urban areas and the formation of agroecological knowledge of database, instructional techniques of quality management of ecosystems, methods for optimal decision-making in the field of management of development of the agro sphere based on environmental laws, allows students-environmentalists acquiring knowledge and skills in the collection, analysis and processing systems, generalized, comprehensive information on the qualitative assessment of the environment and its documentary describing the natural, environmental, social, economic, energy, man-made characteristics of objects of environmental performance, territories, territorial-production complexes and groups, as well as commercial facilities for various purposes, forms the skills of development of evidence-based recommendations for the adoption of environmentally-oriented management solutions.

**Global environmental problems.** To form students' deep knowledge about the development of the global ecological crisis of the biosphere due to natural processes and anthropogenic impact on the environment, the main areas of scientific and practical solutions to environmental problems.

*Optional Block 2. "Radiobiology and radioecology"*

**Assessment of radiation risks for humans and the environment** It forms the knowledge and skills for a comprehensive assessment of the impact on human health and the quality of the environment of objects of economic activity using sources of ionizing radiation (NPP construction projects, operation of existing nuclear reactors, Alienation zone, places of temporary localization of nuclear waste, etc.) on a scale the chosen territory, provides skills for preliminary checking of compliance of projects with current legislation and safety requirements, guarantee of minimization of radioactive isotopes' inflow to the body Judah with food skills for monitoring and control operations in the event of radiation accidents to assess the extent of contamination and radiation risks.

**Radiation hygiene.** As a result of the radiation accident in the affected areas an environment with a complex of unfavorable to the population of the environment (ecological, sanitary, hygienic, economic, economic and social) is formed. This course develops knowledge and skills in protecting people from sources of external and internal radiation when living on contaminated radionuclide territories (obtaining agricultural products that meet the requirements of DR-2006, reducing the equivalent dose of internal radiation, the feasibility of countermeasures), features of solving socio-economic problems and rehabilitation of affected areas by radionuclide contamination.

**Modern methods in radiation research** This course develops the knowledge and skills on the the possibility of using living organisms to determine the migratory ability of radioactive isotopes in the environment and living organism (incoming, outflow, accumulation) and the use of labeled isotopes in biological research; skills and abilities: to measure specific, volumetric radioactivity for  $\alpha$ -,  $\beta$ -,  $\gamma$ -emitting radionuclides, to use the method of labeled atoms and compounds, and conducting autoregraphy. The peculiarities of using bioinformatics tools for assessing the influence of ionizing radiation on living organisms and grouping are considered.

**Radiation biochemistry.** This course develops the knowledge and skills on the basic principles of ionizing radiation action on biological molecules (nucleic acids, proteins, carbohydrates, lipids), organs, tissues and systems of the organism from the moment of energy absorption to the biological systems response; features of radiation-induced damage of membranes, nuclei and mitochondria; development of radiation sickness; radiation hormesis. The mechanisms of free radicals formation and their further transformation in the cell; sequence organism biochemical reaction depending on irradiation dose; regularities of radioprotector action for their application as remedy of protection at internal and external irradiation are considered.

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**Training of masters of sciences  
in branch of knowledge "Natural sciences"  
in specialty 101 "ECOLOGY"  
educational program "ECOLOGICAL CONTROL AND AUDIT"**

Form of Training:	Licensed number of persons:
– Full-time	30
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master of Ecology

**The concept of training**

The aim of education is learning theoretical bases and formation of appropriate practical skills: environmental control procedures and audit of environmental protection and balanced nature use, namely the monitoring of the environment (natural and artificially altered terrestrial and aquatic ecosystems, Hydroecological, geoecological, soil and environmental, phytosanitary, environmental reclamation, bioecological, agrarian forest-technical, socio-environmental, geoinformative); audit (risk, areas, industrial and environmental facilities); environmental passportisation (companies, territories, facilities management and natural reserve fund); inspection (of enterprises and organizations as sources of pollution); examination (activities, goods and services, draft laws and other legal acts pre, project materials and documentation from the introduction of new techniques, technologies, scientific research, software development areas) in environmental consulting, licensing, certification, which will be effectively used in the agricultural and environmental sector to the production of environmentally friendly products and materials.

**Areas of employment of graduates**

Graduates of the specialty "Ecological control and audit" can work as an ecologist, engineer in restoration of natural ecosystems, protection of natural ecosystems, natural resources, environment, nuclear safety; specialist, environmental management, environmental education, standardization, certification and environmental quality spheres; Inspector: radiation safety, environmental protection, nature conservation reserve fund; environmental auditor and expert on ecology.

**Practical training**

Practical training of specialists is carried out in research farms of the National University of Life and Environmental Sciences of Ukraine: Ecological Inspectorate (regions and metropolitan district), Ministry of Environmental Protection and Natural Resources (Kyiv), Institute of Agroecology and Nature Management NAAS (Kyiv), Chernobyl - ecological biosphere reserve (Kyiv region, Ivankiv village), Drevlyansky Nature Reserve (Zhytomyr region, Narodychi village), BioNorma Group (Kyiv), Uzhansky National Nature Park (Zakarpattia region, Velyky Berezny village).

**Proposed Topics of Master's qualification Thesis**

1. Fluctuating asymmetry of the photosynthetic apparatus of linden in the conditions of air pollution of Poltava region.

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2. Ecological assessment of agrochemicals in the system of their state tests and registration.
3. Analysis of environmental factors of biodiversity impoverishment and its long-term dynamics.
4. Assessment of the level of ecological safety of the urban ecosystem by the state of atmospheric air on the example of asymmetry of linden leaves.
5. Analysis of environmentally friendly waste management.

**Curriculum of Master training  
in educational program "Ecological control and audit"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Civil defense	4	exam
CC 2	Sustainable development strategy	4	exam
CC 3	Methods and organization of scientific studies	4	exam
CC 4	Business foreign language	4	exam
CC 5	Environmental legislation	4	exam
<b>Total</b>		<b>20</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6	Ecological inspection	6	exam
CC 7	Ecological management	6	exam
CC 8	Ecological audit	6	exam
CC 9	Environmental toxicology	6	exam
CC 10	Ecological environmental monitoring	4	exam
CC 11	Environmental control	4	exam
CC 12	Regulatory and legal regulation of environmental activities	4	exam
CC 13	Production Practice	9	differential credit
CC 14	Preparation and defense of master's qualification thesis	1	protection of work
<b>Total</b>		<b>46</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
<b>Optional Block 1 "Environmental control"</b>			
OC 1.1	Environmental Risk Assessment activities	4	exam
OC 1.2	Soil and environmental monitoring and management of land resources in the agrosphere	4	exam
OC 1.3	Professional ecological expert activity	4	exam
OC 1.4	Ecotoxicological assessment of agrotechnologies	4	exam
<b>Total</b>		<b>16</b>	
<b>Optional Block 2 "Environmental audit"</b>			
OC 2.1	Environmental impact assessment	4	exam
OC 2.2	Strategic environmental assessment	4	exam
OC 2.3	Balanced nature management (climate change and sustainable energy)	4	exam
OC 2.4	Environmental licensing	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
Total		16	
The total amount of compulsory components		66	
The total amount of optional components		24	
THE TOTAL AMOUNT OF EPP		90	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Civil defense.** The discipline studies the functions and tasks of a unified state system of prevention and emergency response, protection of subjects of economic activity, provides practical skills for the protection of subjects of economic activity and their surrounding area.

**Sustainable development strategy.** The discipline generates knowledge of the principles and strategies of sustainable development as a harmonious process that ensures sustainable economic convergence, promotes environmental ecological culture - the preservation of natural resources, ensures the Biosphere space and environmental safety meeting the needs of human life. Learns provisions of practical implementation mechanisms, coordination and harmonization of social, economic and environmental strands of the development of sustainable society in the country, organizes plans and schedules of stages of sustainable development. Promotes mastery and skills of monitoring the indicators of sustainable development, identifies environmental risks and hazards for human development and sustainable development, promotes the use of international agreements and documents related to sustainable development, performance of plans and programs (region, city, town) in the transition to sustainable development in Ukraine and other countries in transition.

**Methods and organization of scientific studies.** The discipline creates in students a representation of self-creative, scientific thinking and develops the skills of scientific activity, promotes mastery of the latest environmental research methods allowing obtaining the quantitative and qualitative data needed for overall ecological characteristic of objects, processes in the environment leading to the right choice of technology, organizational and administrative decisions, ability to be oriented by the laws and regulations and clearly generate evidence-based conclusions.

**Business foreign language.** The general aim of the program of teaching of foreign language for the professional purpose is formation students' professional linguistic competencies that will contribute to their efficient operating in cultural variety of training and professional environment. The methods of search of new information in another language sources, linguistic methods of analytical study of another language sources are learned. Students study published original literature in another language and increase their lexical and grammatical skills. Methods and linguistic peculiarities of annotation and synopsis of another language sources, the principles of translation of professional oriented another language sources are studied.

**Environmental legislation.** Studies the system of legal norms and principles that regulate and protect public relations for the protection of the natural environment and the rational use of natural resources (environmental relations).



**SPECIAL (PROFESSIONAL) TRAINING CYCLE****Compulsory components of EPP**

**Ecological inspection.** Generates knowledge of the procedures of the influence of society on the environment, monitoring and evaluation of the impact of economic and social activity in the living environment (air, water, soil), the degree of environmental safety or environmental economic activity of the situation at the sites (areas), natural resources and human health across particular objects, preventing or stopping the negative impact of certain types of human activities on human health and the environment, mastering the methodology and procedures of state control in the sphere of environmental protection and use of natural resources, monitoring of compliance with environmental legislation, prediction, prevention and establishing the degree of environmental risks and ecological security study conclusions environmental control, environmental inspection entities (individuals and legal entities) of all shapes, forms, basic tasks, functions, structures and rights of Environmental Inspection, the procedure for organizing and conducting environmental inspections, order forms and types of prosecution of violators of international and national environmental legislation. Provides the skills of a comprehensive science-based control certain types of activities in order to determine the degree of environmental risk, the definition of sustainable activity in the course of matching the inspected object to the requirements and standards of environmental legislation, evaluating efficacy study of measures for the protection of the environment; training objective conclusions based on the results of environmental monitoring; clearance acts on the results of inspections and public awareness.

**Ecological Management.** Environmental Management examines managerial relationships in an institution ensuring its sustainable development, environmental protection, safety of human life, sustainable use of natural resources and environmental safety of the institution and its activity aimed to the implementation of environmental objectives and programs of environmental impact, and creates a knowledge of environmental strategy of social development, management of natural resources and environment-related activity, which are determined by biological and socio-economic characteristics of enterprises, strategic goals of the society and allow the enterprises to survive and achieve their goals in the long run.

**Ecological Audit.** Environmental audit is a management tool which examines the effectiveness of management in preserving the environment and maintaining competitiveness through ecological production, creates knowledge of systematization, documentation, frequency of objective evaluation of conformity of environmental management, operation of equipment and its conformity with environmental objectives, creates the ability and skills for assessment of environmental regulations and environmental policies of the company.

**Environmental toxicology.** Environmental toxicology is an integrated science that is directly related to environmental protection, the overall ecology and toxicology, based on the use of advances in advanced technologies for preventing and counteracting the effects of harmful substances on biological objects of natural ecosystems. Ecological toxicology studies ecological aspects of toxicokinetics, toxicodynamics, toxicometry, reactions of biological systems to poisons, assessment of risk and harmfulness of toxins in the environment, as well as methods and technologies for preventing poisoning and detoxification of poisons in the environment.

**Ecological environmental monitoring.** Studies the set of scientific, educational, industrial (technological) problems, which in their specificity, diversity are similar and considered as a whole from the point of view of the object studied in ecosystems of different types, forms skills of building scenarios of presentation, development of

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ecosystems and research methods. objects, their components (description, explanation, interpretation, modeling, forecasting, prevention, design, construction).

**Environmental control.** The discipline examines features of monitoring systems (observations) natural ecosystems, agricultural lands, urban areas and the formation of agroecological knowledge of database, instructional techniques of quality management of ecosystems, methods for optimal decision-making in the field of management of development of the agro sphere based on environmental laws, allows students-environmentalists acquiring knowledge and skills in the collection, analysis and processing systems, generalized, comprehensive information on the qualitative assessment of the environment and its documentary describing the natural, environmental, social, economic, energy, man-made characteristics of objects of environmental performance, territories, territorial-production complexes and groups, as well as commercial facilities for various purposes, forms the skills of development of evidence-based recommendations for the adoption of environmentally-oriented management solutions.

**Regulatory and legal regulation of environmental activities.** The discipline examines the system of mandatory functional and environmental requirements for products, technologies, management, is aimed to improving their environmental performance and implementing the system-wide identification for establishing compliance and certification. Provides the ability and skills in management, preparation and development of documents certifying conformity of environmental management of the enterprise to the requirements of standards and additional regulatory documents. Generates knowledge of basic provisions and terminology of the state control on the environment, the current state of the environment in Ukraine and Europe, environmental regulation of control parameters of the environment, methods and means of control of parameters of the environmental objects, transboundary pollution issues, accreditation of laboratories, using interlaboratory comparative trials.

### **Optional components of EPP**

#### ***Free choice according to specialty***

#### ***Optional Block 1 "Environmental control"***

**Environmental Risk Assessment activities** Generates knowledge and skills of comprehensive assessment of the impact on natural resources, human health and environmental quality of various innovations (projects of enterprises, buildings, structures, technologies, inventions, standards, materials, products, materials, designs transform nature etc.) across selected areas of the region, and providing skills for pre-verification of compliance with the requirements of environmental protection projects of social and environmental guarantees of importation of environmentally friendly products and technologies, research and management of human impacts on the environment through the assessment of technology and environmental risks.

**Soil and environmental monitoring and management of land resources in the agrosphere.** Learns the basics of effective use of soil management in accordance with environmental legislation. The aim of the course is to explore the theoretical and practical assimilation of Land Management as a soil biotic complex, which is the basis of agro-ecosystems, the introduction of environmental friendly technologies aimed to restoring the soil fertility, use of intensive, extensive technologies for products and raw materials, and reducing anthropogenic nutrient loading on agroecosystems , implementation and development of alternative ("organic") agriculture, land management and reclamation in the dangerous areas due to the erosion. Meeting the relevant agricultural requirements of applicable law, the applicable standards and regulations, standardization, certification, licensing the operation of land for various purposes in agricultural domain.

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**Professional ecological expert activity.** Discipline ensures the formation of students' knowledge of the requirements for specialist training in accordance with the construction of higher education and scientific research, the formation of primary knowledge on the basics of ecology and perceptions of future employment, acquirement of the basic concepts and terminology of ecology and understanding of the economic aspects of the environment, understanding of ways of environmental development of society.

**Ecotoxicological assessment of agrotechnologies** studies the toxic effects of pollutants on ecosystems, populations and organisms, existing environmental problems and radiation threats to the population and territories, existing in the state system of environmental and radiation safety evaluation at all levels - from local to global - the probability of negative changes in the environment caused by anthropogenic or other influence.

*Optional Block 2 "Environmental audit"*

**Environmental impact assessment.** The discipline provides students with knowledge on identifying the nature, intensity and degree of danger of the impact of any type of planned economic activity on the environment and public health.

**Strategic environmental assessment.** The discipline provides students with knowledge about the procedure for determining, describing and assessing the consequences of state planning documents for the environment, including public health, justified alternatives, developing measures to prevent, reduce and mitigate possible negative consequences.

**Balanced nature management (climate change and sustainable energy).** The discipline provides students with knowledge about the rational and efficient use of natural resources, the organization of an effective system of environmental protection.

**Environmental licensing.** The discipline provides students with knowledge on the granting of special permits to business entities by authorized state bodies to engage in certain activities with given environmental restrictions and natural resource limits.

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**Training of masters of sciences  
in branch of knowledge "Chemical and Bioengineering"  
in specialty 162 "BIOTECHNOLOGY AND BIOENGINEERING"  
educational program "ENVIRONMENTAL BIOTECHNOLOGY  
AND BIOENERGETICS"**

Form of Training:	Licensed number of persons:
– Full-time	30
– Part-time	30
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Biotechnology and Bioengineering

**The concept of training**

The aim of studying is mastering the theoretical basis and formation of appropriate practical skills by researching biological objects considering classical and modern scientific approaches, which harmonically combine student's perception and understanding of biotechnological and ecological directions. Special part allows to master main methods of work with genetic material, which is necessary for preparing high-qualified specialists of branch subdivisions. Practical part allows students to master the use of newest biotechnologies that are based on the use of laws of live nature for creation and realization of the newest systems for agrarian- industrial complex, energetics, light, chemical, mining industries, oil refining complex, quality management of biotechnology products, problems of legislative regulations, management and marketing, problems of biosafety and bioethics.

**Educational and professional program of master's training**

***Optional block "Industrial biotechnology"***

The essence of the master's program is to study classical and modern methods and techniques of biotechnological work with microorganisms - producers used in industrial biotechnology, methods of obtaining pure and accumulative crops, cultivation of aerobic and anaerobic microorganisms in laboratory conditions for use in industry, study of culture and physiology. microorganisms-producers of industrially important substances, research of features of growth of microorganisms in periodic and continuous culture for use in production of results of a practical combination of fundamental and applied researches in industrial biotechnology.

**Areas of employment of graduates**

Graduates work in the enterprises of ecological and sanitary control, in control-producing and control-analyzing laboratories, centers of product certification, commercial firms, and scientific research institutions on the posts of chief specialist, microbiologist, laboratory manager, senior laboratory assistant, scientific employees, bacteriologist, virologist, mycologist etc., postgraduate studies.

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### **Optional block "Phytobiotechnology"**

The program aims to study a set of technologies that use biological processes of plant cells to obtain biomass, whole organisms or products of their life, techniques for modification, improvement, creation and reproduction of plant organisms, obtaining nutrients from them.

### **Areas of employment of graduates**

Graduates work in institutions of environmental and health surveillance, in the control of production and control and analytical laboratories, centers of certification, commercial firms, post-graduate studies.

### **Practical training**

Ukrainian Laboratory of Quality and Safety of Agricultural Products, State Enterprise "Ukrainian Research and Training Center of Standardization, Certification and Quality, State Scientific Control Institute of Biotechnology and strains of microorganisms, LLC "Agrus", Ukrainian State Research Institute "Resource", LLC of "Green Wolf".

### **Proposed Topics of Master's qualification Thesis**

1. Biotechnology and the use of a biological product Tryhoderminu-R based on new strains of fungi of the genus Trichoderma.
2. Studies of the interaction and use of eubacteria Clostridium new-NT for the treatment of cancer kolorektal-tion in Mus Musculus.
3. Biological and molecular genetic characteristics of the viruses perennial legumes.
4. Development of molecular diagnostic systems for the diagnosis and identification of the virus holeness wood apple.
5. Biotechnological processes and modes of equipment for biological protection of corn in SE NUBiP Ukraine "Agronomic Research Station".
6. Pathological changes of fungi Pleurotus ostreatus Kumm. under conditions of bacterial infection in biotechnological processes.
7. Molecular genetic characteristics of the viruses of lucerne (Medicago sativa).
8. Biotechnological process of composting of agricultural waste.
9. Molecular genetic polymorphism raspberry varieties Ukrainian selection for DNA markers.
10. Development of molecular diagnostic system for diagnosis and identification of virus Sharkey plum (Plum Pox Virus).

### **Curriculum of Master training in educational program "Environmental biotechnology and bioenergetics" (educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Philosophy of science and innovation development	4	exam
CC 2	Civil defense and Strategy of sustainable development	4	exam
CC 3	Ecology Biotechnology	5	exam
CC 4	Plant Biotechnology	5	exam
CC 5	Information Technology	4	exam
CC 6	Bioinformatics and Biological Statistics	4	exam
<b>Total</b>		<b>26</b>	

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
<b>Optional components of EPP</b>			
<i><b>Free choice according to the preferences of students from the list of disciplines</b></i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 7	Methodology and organization of scientific research on the basics of intellectual property	4	exam
CC 8	Business foreign language	4	exam
CC 9	Agricultural policy	4	exam
CC 10	Instrumental methods of analysis	5	exam
CC 11	Biosafety	4	exam
CC 12	Design bioprocess	4	exam
CC 13	Biotechnology in agriculture and biotechnology in environmental biotechnologies	4	exam
CC 14	Biomarketing of biotech products	4	exam
CC 15	Production Practice	6	
CC 16	Preparation and defense of master's qualification thesis	1	
<b>Total</b>		<b>40</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to specialty</b></i>			
<i><b>Optional Block 1 "Industrial biotechnology"</b></i>			
OC 1.1	Technologies of microbiological productions	4	exam
OC 1.2	Pharmaceutical biotechnology	4	exam
OC 1.3	Biotechnology of food production	4	exam
OC 1.4	Molecular genetic bases of biotechnological productions	4	exam
<b>Total</b>		<b>16</b>	
<i><b>Optional Block 2 "Phytobiotechnology"</b></i>			
OC 2.1	Productivity of photosynthesis and nanobiotechnology	4	exam
OC 2.2	Cellular signaling	4	exam
OC 2.3	Secondary metabolism of plants	4	exam
OC 2.4	Ecophysiology	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of EPP**

**Philosophy of science and innovation development.** Studying the specifics of the philosophy of science and innovation development as a special type of human knowledge and as an academic discipline. The main stages of the historical development of the major trends and methodological techniques solve the main problems of philosophy of science based on the comparative characteristics of classical and nonclassical are considered. Postnonclassical ideals of scholarship. Studying ontological, epistemological, epistemological, methodological, structural and organizational, ideological, moral values and principles of measurement philosophy of science. Philosophical analysis of specific current state of Ukrainian and world science, the prospects for their development and interaction with other spheres of social life, and basic problems of biology and ecology.



**Civil defense and strategy of sustainable development** Examining the functions and tasks of a unified state system of prevention and emergency response, protection of economic activity, providing practical skills for the securing of economic activity and its surrounding area. Studying provision of practical implementation mechanisms, coordination and harmonization of social, economic and environmental sustainable society in the country, organizes plans and timing of stages of the objectives of sustainable development. It promotes mastery and skills monitoring of indicators of sustainable development, identifying environmental risks and hazards for human development and sustainable development, the use of international agreements and documents related to sustainable development, developing plans and programs (region, city, town) in the transition to sustainable development of Ukraine and other countries in transition economy.

**Ecology biotechnology.** Biotransformation, biodegradation bioavailability of major biochemical pathways of microbiological transformation of organic xenobiotics and genetic bases of creation of recombinant microorganisms, degradation of organic xenobiotics, pollutants biodegradation of inorganic nature, natural or synthetic polymeric materials, environments, anaerobic biological treatment, systems design and construction of anaerobic biological treatment, bioremediation soil bioremediation «in situ», «off site», Biological removal of heavy metals and radionuclides, phytoremediation, biological purification and deodorization gas-emission microbiological processing of organic waste.

**Plant Biotechnology.** Studying basic directions and prospects of plant biotechnology, object and methods of biotechnology, culture of isolated cells and tissues, callus and suspension cultures, microclonal plant propagation and recovery from viral infections, morphogenesis and regeneration of plants under in vitro (organogenesis, embryogenesis), selection of plants under in vitro, cellular and genetic engineering methods for creating transgenic plants.

**Information Technology.** Mastering the art information technology based on knowledge of technical components of computer systems and required complex software to organize and implement information and research complex in ecology and biotechnology for processing textual, numerical and graphical information, conduct mathematical analysis of experimental studies, as well as preparation of advertising and promotional materials to highlight the research results, methods of mathematical models of the major abiotic and biotic processes, use of basic elementary functions and their combinations for constructing models.

**Applied Ecology.** The mechanisms of destruction of the biosphere, methods and techniques of environmental management. Geotechnological, technosocial economical and environmental research, the specific relationships of organisms and the environment they exist in different geographical areas. Features of natural resources, development of environmental regulations and technical means of environmental protection, restoration of destroyed ecosystems.

**Bioinformatics and Biological Statistics.** Forms knowledge of the basic methods of statistical data processing Math Card. Provides skills in mathematical processing of research results, graphics, orientation in modern concepts of bioinformatics to have a holistic view of the structure and methods of analysis of biological sequences, structure and methods of analysis of spatial structures of biological molecules, structure and methods of computer genomes, to form a holistic and a systemic and view of the organization of biological information at the molecular level.

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**SPECIAL (PROFESSIONAL) TRAINING CYCLE****Compulsory components of EPP**

**Methodology and organization of research with the principles of intellectual property.** The aim of the discipline is formation of the system of knowledge in methodology, theory of method and research process, methodical support of scientific and research activity at the stages of preparation of a Master paper, formation of the ability to organize research of a specific issue using the whole complex of the traditional methods of research including general and special methods. The main task of the theoretical part of the course is introduction to students the current concepts of research creation, the principles of methodology of scientific perception and methods of research. The main task of the practical part is the development of self-education ability, mastering skills of formation and application of perceived methodological position of research. In case of mastering the course students have to improve their skills of search, assortment and processing of scientific information, accurate formulation of a problem, aim, task, object, subject, methods of research. Introduction to students the principles of intellectual property and direction of them to gain knowledge and skills concerning registration of rights of ownership, their protection, commercialization, estimation and management are envisaged. Both national and foreign experience is studied. In case of mastering the material students get the possibility to form their own view on professional base about processes and phenomena happening in agrarian sector of the state economy.

**Business foreign language.** The general aim of the program of teaching of foreign language for the professional purpose is formation students' professional linguistic competencies that will contribute to their efficient operating in cultural variety of training and professional environment. The methods of search of new information in another language sources, linguistic methods of analytical study of another language sources are learned. Students study published original literature in another language and increase their lexical and grammatical skills. Methods and linguistic peculiarities of annotation and synopsis of another language sources, the principles of translation of professional oriented another language sources are studied.

**Agrarian policy.** The discipline introduces the principles of formation of policy in agrarian sphere, gives the possibility to gain proficiency in methodical and methodological principles of the development and realization of the complex of actions concerning support and provision of the development of agriculture in the system of inter-branch links in national economy as well as estimate from the theoretic position practical actions of state structures concerning regulation of the agricultural production of the country.

**Instrumental methods of analysis.** Studying the basic theoretical principles underlying physical, chemical and visual instrumental systematic study of biological objects in vitro and in vivo. Studying the basic techniques of electrophoresis, chromatography, colorimetry and spectrophotometry, the technique works on light, fluorescent, confocal and electron microscopes.

**Biosafety.** We study the heredity and variation of organisms with artificially created new features, as well as their distribution and possible consequences for ekobiocenoses.

**Design.Bioprocess** Studying the techniques of designing biotechnological equipment and techniques needed to master the development and introduction of new bioprocess.

**Biotechnology in agriculture and biotehmetody in environmental biotechnologies.** The use of non-waste technologies and processes in agriculture, rational use of organic fertilizers, silage, feed additives, amino acids, enzymes, growth regulators, biological products, plant protection against pests without breaking agroecocenosis. Biotechnological processes in ecosystems that are created during the growth of environmentally friendly crop production are explained.

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**Biomarketing of biotech products** are considered general principles and functions, basic categories and concepts of biomarketing of biotechnology products, pricing methods, methods of promotion and marketing, the organization and control of marketing activity that forms the basis of the marketing practices of biotech products. Attention is focused on the market research products or services biotechnological direction; range planning biotechnology products in enterprises; organization processes and sales promotion services or biotech company. The market economy makes new demands to specialist biotechnology. They must be qualified, have modern means of organization of industrial and commercial activities, timely adapt to changing of marketing environment, to ensure sustainable functioning of biotech companies.

**Optional components of EPP**  
***Free choice according to specialty***  
***Optional Block 1 "Industrial biotechnology"***

**Technologies of microbiological productions.** The discipline studies theoretical and practical aspects of microclonal propagation of plants in vitro, namely: principles and theoretical foundations of nutrient media, the influence of growth regulators on plant growth and development, physiological basis of morphogenesis, method and technique of microclonal propagation, apical dominance. Emphasis is placed on microclonal propagation of herbaceous and woody plants (cultivation of tropical and subtropical plants, technical, cereal, vegetable, fruit, berry and woody crops).

**Pharmaceutical biotechnology.** Provides theoretical knowledge and develops practical skills in the development and production of drugs by biotechnological methods, general requirements for biotechnological drugs of different groups, modern areas of pharmaceutical biotechnology. The subject of the discipline is the main provisions and trends in the development of pharmaceutical biotechnology in Ukraine and the world; modern principles of drug production in various dosage forms with the use of biotechnology methods - microbial synthesis, cell technologies, genetic engineering methods, the main modern types of equipment for biotechnological productions.

**Biotechnology of food production.** Gaining knowledge about the main types of existing food biotechnological industries; acquaintance with biological agents of food biotechnology; acquaintance with technological processes and equipment of food biotechnology; acquaintance with bioengineering and technical solutions of biological technologies used in the production of food, food additives, biologically active additives, etc .; formation of students' theoretical base of professional training on free orientation in solving practical problems in the application of biological technologies in the food industry; formation of students' scientific practical worldview, analytical thinking, which will contribute to solving global problems of today: food, human health, national security and sustainable development of the country through the introduction of the latest food biotechnological processes.

**Molecular-genetic bases of biotechnological productions.** The main purpose of studying the discipline is to master the theoretical bases and formation of appropriate practical skills in the study of biological objects and genetically modified organisms, methods and techniques of genotyping of valuable agricultural plants and their DNA certification, taking into account modern scientific approaches. combine perception and understanding of practical and theoretical knowledge for students of environmental and ecobiotechnological direction. Objectives of the course: forms knowledge about methods of cloning DNA fragments, features of the structure of vectors based on prokaryotes and eukaryotes, creating libraries of genomes, restriction maps, obtaining drugs, obtaining transgenic plants and animals. As a result of studying the discipline, the master must be able to plan and select the optimal conditions for the production of recombinant DNA and

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the transformation of genetic material on the basis of the latest achievements, using methodological recommendations.

*Optional Block 2 "Phytobiotechnology"*

**Productivity of photosynthesis and nanobiotechnology.** The field of modern science and technology based on the application of nanotechnology in biomedicine through the use of bionanostructures as a matrix for the synthesis of nanomaterials and tissue engineering as components of electronic devices, nanocontainers for targeted delivery of pharmacological agents and nanorobots for terrorism

**Cellular signaling.** The course is devoted to the study of the implementation of genetic information in the process of ontogenesis. In the course of studying the course students get acquainted with the morphological aspects of development, as well as with the biochemical and molecular genetic mechanisms that accompany them in the process of embryonic and postnatal development. Particular attention is paid to the molecular genetic aspects of the processes of determination and differentiation of cells, as well as their stability during ontogenesis.

**Secondary metabolism of plants.** The task of the discipline is to get acquainted with the secondary metabolism of plants, to characterize the main groups of biologically active substances of plant origin, mechanisms of their synthesis, chemical properties and physiological action, to identify the most promising BAS for use in pharmacological, food and light industries.

**Ecophysiology.** Studies the role of major environmental factors in plant life, ways of plant adaptation to environmental factors, the relationship of plants with other organisms, human impact on the plant world, periodic phenomena in plant life. After completing the course, students will be able to identify the adaptive features of plants of different ecological groups, organize and conduct research in the field of plant ecophysiology, work independently with the scientific literature, use theoretical

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 202 "PLANT PROTECTION AND PLANT QUARANTINE"  
educational program "PLANT PROTECTION"**

Form of Training:	Licensed number of persons:
– Full-time	75
– Part-time	50
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Plant Protection Scientists

**The concept of training**

Experts in the field of plant protection should have interdisciplinary theoretical knowledge about future activities and development of practical skills application of knowledge gained in the process of production and training practices and master's work. During the program, students acquire knowledge in such areas: entomology, phytopathology, herbology and plant quarantine. Experts in Plant Protection should have profound knowledge of biology, ecology, distribution, and damage characteristics of plants, breeding of pests, ensure phytosanitary control of seed and planting material, plants, soil, air, holding science-based support on the integrated protection of agricultural crops from pests, providing counseling for professionals of agricultural companies, farmers and private owners in carrying out measures to protect crops from pests and controlling of the situation.

**Educational and professional program of master's training**

***Optional Block "Biological justification of obligate and facultative pathogens control"***

Demands obtaining by the experts of multilateral interdisciplinary knowledge regarding justification of environmentally friendly measures of restricting the development of the most common obligate and facultative parasites of major crops and development of the skills of practical application of the gained knowledge.

**Areas of employment of graduates**

Graduates can work as researchers in research institutions of Ukraine, as heads of laboratories, technicians, senior experts; in services for testing of plant varieties for resistance against pests, in seed inspections, etc.

***Optional Block "Phytosanitary monitoring and forecasting"***

The program provides training for work in the State regional and district alarm services and forecasting of harmful and beneficial biodiversity of phytocenosis; inspections of plant protection and quarantine, pest control services, scientific research institutions, control and toxicological laboratories and biological plant protection, in farms of different ownership.

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### Areas of employment of graduates

Graduates can work in supporting companies of forecasts and occurrence of pests, farms of different ownership, companies, associations, societies of agricultural direction, in the position of scientific-research institutions of plant protection in regional inspections of plant protection and related areas of work (agronomic and agrochemical service).

### Practical training

Teaching and research farms of NULES of Ukraine: PC of NULES "Agronomic Research Station", "Velykosnitynske TRF by the name of O. V. Muzychenko", TRF of NULES of Ukraine "Fruit and Vegetable Garden".

Research institutions of NAAS of Ukraine: Institute of Plant Protection, Institute of Microbiology and Virology, Institute of Horticulture, Institute of Ecological Hygiene and Toxicology by name of L.I. Medved, Institute of Zoology by name of I.I. Schmalhausen, Institute of Beekeeping, Institute of Agriculture, Institute of Bioorganic Chemistry, Research Center of the Institute of pomology by the name of L.P. Symerenko (Cherkasy reg., Horodyshche district, Mliiev).

State Service of Ukraine for Food Safety and Consumer Protection.

PC "Agro-Soyuz" Dnipropetrovsk region, CLL "Barishevsky Grain Company", Rivne Plant Protection Research Station, State Kostopolsky varietal station in Rivne region, agency of firms in Ukraine producing pesticides: Syngenta, Monsanto, BASF, Arysta Life Science, Bayer, JSC "Trans Oil" and others.

### Proposed Topics of Master's qualification Thesis

1. Optimization of useful insect culture in laboratory and production conditions.
2. Environmental peculiarities of leaf-eating fruit pests and influence of abiotic factors on the dynamics of their population.
3. Influence of anthropogenic factors on development of harmful insects.
4. Influence of biotical factors on development of herbivorous insects in green house terms.
5. Activity of ferments and their role in resistance to plant diseases.
6. Research of mikotoksin role in development of plant diseases.
7. Resistance of microbial cenosis structures of basic soil types while different use.
8. Comprehensive effect of herbicides on sowing of cereals, legumes, technical, oil and vegetable crops.
9. Specific composition and bio-ecological features of basic rodents at field crops and measures of their control.
10. Measures of imported vegetable material protection from managed quarantine and unquarantine herbivorous insects.

### Curriculum of Master training in educational program "Plant protection" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Business foreign language	4	exam
CC 2	Methodology and organization of scientific research on the basics of intellectual property	4	exam
CC 3	Biosafety in Plant Protection	4	exam

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**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
CC 4	Logistic and communications in Plant Protection	4	exam
CC 5	Economic and organization of agricultural service	4	exam
<b>Total</b>		<b>20</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6	Complex systems of crop plant protection from diseases	4	exam
CC 7	Phytophagous insect management	4	exam
CC 8	Management of the number of drills in agricultural societies	4	exam
CC 9	Phytosanitary documentation and standardization	4	exam
CC 10	Toxicology of Pesticides	4	exam
CC 11	Technologies of cultivation and use of organisms in biological of plants protection	4	exam
CC 12	Epiphytology	4	exam
CC 13	Crop Seed pathology	4	exam
CC 14	Disinfection of agricultural products	4	exam
CC 15	Preparation and defense of master's qualification thesis	4	
CC 16	Production Practice	6	
<b>Total</b>		<b>46</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Biological justification of obligate and facultative pathogens control"</i>			
OC 1.1	Actinomycetes diseases of plant	4	exam
OC 1.2	Physiological and biochemical aspects of plant resistance to disease	4	exam
OC 1.3	Mycotoxicology	4	exam
OC 1.4	Pathogenesis in plant production	4	exam
OC 1.5	Pathological process of plants' root system	4	exam
<b>Total</b>		<b>16</b>	
<i>Optional Block 2 "Phytosanitary monitoring and forecasting"</i>			
OC 2.1	Insect pathology.	4	exam
OC 2.2	Insects ecology	4	exam
OC 2.3	Technical entomology	4	exam
OC 2.4	Insect physiology	4	exam
OC 2.5	Control of biota of cultural phytocenoses	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of EPP**

**Business foreign language.** The general aim of the program of teaching of foreign language for the professional purpose is formation students' professional linguistic competencies that will contribute to their efficient operating in cultural variety of training and professional environment. The methods of search of new information in another language sources, linguistic methods of analytical study of another language sources are learned. Students study published original literature in another language and increase their

lexical and grammatical skills. Methods and linguistic peculiarities of annotation and synopsis of another language sources, the principles of translation of professional oriented another language sources are studied.

**Methodology and organization of research with the principles of intellectual property.** The aim of the discipline is formation of the system of knowledge in methodology, theory of method and research process, methodical support of scientific and research activity at the stages of preparation of a Master paper, formation of the ability to organize research of a specific issue using the whole complex of the traditional methods of research including general and special methods. The main task of the theoretical part of the course is introduction to students the current concepts of research creation, the principles of methodology of scientific perception and methods of research. The main task of the practical part is the development of self-education ability, mastering skills of formation and application of perceived methodological position of research. In case of mastering the course students have to improve their skills of search, assortment and processing of scientific information, accurate formulation of a problem, aim, task, object, subject, methods of research. Introduction to students the principles of intellectual property and direction of them to gain knowledge and skills concerning registration of rights of ownership, their protection, commercialization, estimation and management are envisaged.

**Biosafety in Plant Protection.** Includes the study of the impact of pesticides on living objects environment, toxicological and hygienic characteristics of chemical classes of pesticides, safety requirements at work, what related with the use of pesticides. It deals with studying of accident prevention at all types of works, which are related to application, transportation, storage of pesticides, and also laws of Ukraine and instructional materials concerning plant protection, as well as social and legal defense of specialists of this industry.

**Logistic and communication in Plant Protection.** The course is focused at analyze of supply, transpiration and storage of plant protection products with identification factors effecting level of production and sells of microbial products, pesticides and agrochemicals in different regions of Ukraine. The course is a foundation for estimation of plant protection products effective transportation of by mean using logistical models and computer technologies, considering mechanism of synergetic efficient use of compounds in local, regional and state levels.

**Economic and organization of agricultural service.** This objects economic efficiency of agricultural service in market relations. Future specialists know specification of economic and business relations between agricultural farms and another spheres of agricultural industry.

## SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Complex systems of crop plant protection from diseases.** Using the newest informational and specialired technologies of plant prection Against diseases. The control of development of diseases of bield, vegetable and bonit crops and grape plantig are.

**Phytofagous insect management.** Phytofagous insect management deals from one side with key agricultural pests and from another side provide foundation for the population dynamic forecast and management (regulation) of phytophagous insects pests which is the important part of crop production technology.

**Phytopsanitary documentation and standardization** Includes the study of basic regulatory documents that regulate the effective implementation of various technological operations in plant protection, the main legal aspects of the application of various

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pesticides in crop production. Attention is paid to the laws on standardization and safety of crop production.

**Management of the number of drills in agricultural societies** - The content of the discipline involves the study of the factors that regulate the number of weeds in the phytocenoses of crops, environmental and economically sound principles of integrated protection of crops from weeds.

**International phytosanitarian standards.** Discipline studies the types of modern international phytosanitary standards and purposes of their creation, application and use.

**Toxicology of Pesticides.** Contents discipline toxicology of pesticides involves voluminous factual material on the rational and environmentally safe use of pesticides in agriculture, given their biological activity and the impact on the environment. We study the mechanism of action of pesticides on pests, crops, mammals, humans and the environment in general.

**Technologies of cultivation and use of organisms in biological of plants protection** the discipline involves studying the current state of the development of useful insects in Ukraine and in the countries of the world. After studying the discipline, the Master must be familiar with the technology of the cultivation of useful insects on host insects and on artificial nutrient media and be able to use these populations in the biological and integrated protection of plants from pests in open and closed soils.

**Epiphytology.** The program provides for familiarization of students with the science of epiphytoses and different protective measures against diseases based on the intense increasing of infection and the interconnection between amount of infectious onset and disease development, to determine an influence of phytosanitation, selection of disease resistance, fungicides application and their influence on pathological process of limitation and abolition of epiphytoses.

**Crop Seed pathology.** The condition of seed infection, methods of phytopathological examination, ways of decrease of affect and damage of seed; seed pathology of basic groups of cultures, saprotrophic mycobiota of seed.

**Disinfection of agricultural products.** Foresees the study of technologies of disinfection of imported vegetable materials and plant products with the purpose of prophylaxis or eliminations of quarantine species while export-import trading operations.

### **Optional components of EPP**

#### ***Free choice according to specialty***

#### ***Optional Block 1 "Biological justification of obligate and facultative pathogens control"***

**Actinomycetes diseases of plant.** The study of their biological and ecological features will be instrumental in timely diagnostics of actinomycosis and conducting of protective measures. Monitoring of actinomycetes diseases. Diagnostics of symptoms of actinomycetes diseases, learning methods of agent recovery in pure culture.

**Physiological and biochemical aspects of plant resistance to diseases.** Physiological and biochemical features of plants, which increasing plant immunity to diseases, training with methods of studying anatomical, morphological, physiological, biochemical characteristics of infectious and healthy plants to determine plant resistance to disease. Discipline is one of the main training disciplines for plant protection specialists and is based on using of infectious backgrounds in selection of new crop varieties with high resistance to diseases.

**Mycotoxicology.** Discipline allows students to analyze the features of toxic substances micromycetes, to characterize toxicogenic ability of phytopathogenic fungi, to justify measures to reduce damage plants, to overtake of method for determining mycotoxins in plant products.

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**Pathogenesis in plant production.** Discipline explores the main diseases of plant production in the post-harvest period, its loss through effect of pathogenic organisms and influence of external environmental factors on the pathogenic development.

**Pathological process of plants' root system.** The main purpose of discipline is a study of species composition of the ground pathogens, which cause diseases of plant root system, research of roots pathology symptomatology, methods of their monitoring, establishment of bioenvironmental properties of microorganisms and features of the pathological process at the defeat of plants rootage, development and improvement of measures on the increase of resistance of agricultural crops against ground micromycetes.

*Optional Block 2 "Phytosanitary monitoring and forecasting"*

**Insect pathology.** Morphological characteristics, pathogenesis and epizootiology of important pathogen species in each major taxonomic group with examples of use in biological control programs and disease mitigation methods. In the laboratory, participants can learn how to identify the pathogen groups by observing the gross pathology of infected insects and to use phase contrast microscopy to observe the isolated pathogens. Laboratory techniques for studying and archiving pathogens were demonstrated and practical training provided.

**Insects ecology.** Is based on the study of influence of the different factors of filament on the regulation of the number of insects, basis morphological and physiological species and means existence.

**Insect physiology.** Insect physiology-is a study of internal and external structure and function of inspiration, extractor, digestion and circulatory systems, immunity reactions of hemicycle, functional organization of nervous system and chemoreceptor, endocrine organs, attractants and repellents and the role of hormones in reproduction and life cycle.

**Technical entomology.** Theoretical and practical skills of creating and controlling of insect culture during selection of initial material and introduction in artificial reproduction condition up to creation of initial population is considered.

**Control bioti cultural fitotsenoziv** distsiplina scho vivchae sistemi Zahist cultural fitotsenoziv od shkidlivih organizmiv of metoyu steel ih formuvannya that funktsionuvannya, otrimannya in an assortment that optimumi yakisnoi that bezpechnoi fitoproduktsii fallow od obraniv napryamkiv ii virobnitstva, of urahuvannyam ekonomichnih that prirodoohoronnih parametriv tosho. Vivchennya of the foundations of discipline to allow maybutnim fahivtsy to reject the knowledge of effective control economically and corny biota of young cultural phytocenoses in the minds of Ukraine.

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 202 "PLANT PROTECTION AND PLANT QUARANTINE"  
educational program "QUARANTINE OF PLANTS"**

Form of Training:	Licensed number of persons:
– Full-time	50
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Inspector Plant Quarantine

**The concept of training**

In the process, students receive theoretical and practical knowledge and skills for the protection and quarantine of plants based on the latest methodology of scientific activities for effective implementation of the tasks of educational-scientific-production and innovation. Experts in the field of protection and quarantine of plants study of harmful and beneficial insects, mites, rodents, weeds, flowering parasites, venerated, plant diseases (fungal, bacterial, viral and other) and protection of crops from pests and learning to provide advice to the specialists of the farms, farmers and private owners in carrying out activities of protection of agricultural crops from pests and compliance of their control.

**Educational and professional program of master's training**

***Optional block "Quarantine of Plants"***

Program provides training of specialists with knowledge of domestic and European phytosanitary legislation; skills of pest control object control of internal and external plant quarantine, phytosanitary thorough examination; pest risk analysis of pests on the possibility of acclimatization in Ukraine; potential environmental and economic impacts and measures on their localization and elimination.

**Areas of employment of graduates**

Graduates are able to work as inspectors in the State Veterinary and Phytosanitary Service of Ukraine and its regional branch; quarantine laboratories in positions entomologist, plant pathologist, herboloha, nematoloha; in research institutions of Ukraine as researchers, technicians and others.

**Practical training**

Teaching and research farms of NULES of Ukraine: PC of NULES "Agronomic Research Station", "Velykosnitynske TRF by the name of O. V. Muzychenko", TRF of NULES of Ukraine "Fruit and Vegetable Garden".

Research institutions of NAAS of Ukraine: Institute of Plant Protection, Institute of Microbiology and Virology, Institute of Horticulture, Institute of Ecological Hygiene and Toxicology by name of L.I. Medved, Institute of Zoology by name of I.I. Schmalhausen, Institute of Beekeeping, Institute of Agriculture, Institute of Bioorganic Chemistry, Research Center of the Institute of pomology by the name of L.P. Symerenko (Cherkasy reg., Horodyshe district, Mliev).

State Service of Ukraine for Food Safety and Consumer Protection; Ministry of Ecology and Natural Resources of Ukraine, Ministry of Agricultural Policy of Ukraine;

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agency of firms in Ukraine producing pesticides: Syngenta, Monsanto, BASF, Arysta Life Science, Bayer and others.

**Curriculum of Master training  
in educational program "Quarantine of Plants"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Biosafety in Plant and Quarantine Protection	4	exam
CC 2	Methodology and organization of scientific research on the basics of intellectual property	4	exam
CC 3	Business foreign language	4	exam
CC 4	Economic and organization of agricultural service	4	exam
CC 5	Phytosanitary law and international cooperation	4	exam
<b>Total</b>		<b>20</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6	Integrated plant protection	6	exam
CC 7	External and internal plant quarantine.	4	exam
CC 8	Methods for inspection and examination of objects of regulation	4	exam
CC 9	Quarantine pests	6	exam
CC 10	International phytosanitary standards	4	exam
CC 11	Quarantine pest risk evaluation	4	exam
CC 12	Desinfection of Management objects	4	exam
CC 13	Preparation and defense of qualification Master's Thesis	10	
CC 14	Production Practice	4	
<b>Total</b>		<b>46</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Quarantine of Plants"</i>			
OC 1.1	Adventist pests	4	exam
OC 1.2	Geography quarantine organisms	4	exam
OC 1.3	Harmful organisms Ukraine in the international phytosanitary	4	exam
OC 1.4	Quarantine of forest crops	4	exam
OC 1.5	Radio control of food products	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE  
Compulsory components of EPP**

**Biosafety in Plant Protection.** Includes the study of the impact of pesticides on living objects environment, toxicological and hygienic characteristics of chemical classes of

pesticides, safety requirements at work, what related with the use of pesticides. It deals with studying of accident prevention at all types of works, which are related to application, transportation, storage of pesticides, and also laws of Ukraine and instructional materials concerning plant protection, as well as social and legal defense of specialists of this industry.

**Methodology and organization of research with the principles of intellectual property.** The aim of the discipline is formation of the system of knowledge in methodology, theory of method and research process, methodical support of scientific and research activity at the stages of preparation of a Master paper, formation of the ability to organize research of a specific issue using the whole complex of the traditional methods of research including general and special methods. The main task of the theoretical part of the course is introduction to students the current concepts of research creation, the principles of methodology of scientific perception and methods of research. The main task of the practical part is the development of self-education ability, mastering skills of formation and application of perceived methodological position of research. In case of mastering the course students have to improve their skills of search, assortment and processing of scientific information, accurate formulation of a problem, aim, task, object, subject, methods of research. Introduction to students the principles of intellectual property and direction of them to gain knowledge and skills concerning registration of rights of ownership, their protection, commercialization, estimation and management are envisaged.

**Business foreign language.** The general aim of the program of teaching of foreign language for the professional purpose is formation students' professional linguistic competencies that will contribute to their efficient operating in cultural variety of training and professional environment. The methods of search of new information in another language sources, linguistic methods of analytical study of another language sources are learned. Students study published original literature in another language and increase their lexical and grammatical skills. Methods and linguistic peculiarities of annotation and synopsis of another language sources, the principles of translation of professional oriented another language sources are studied.

**Economic and organization of agricultural service.** This objects economic efficiency of agricultural service in market relations. Future specialists know specification of economic and business relations between agricultural farms and another spheres of agricultural industry.

**Phytosanitary law and international cooperation.** Provides study phytosanitary rules of import from abroad, transportation within the country, and exports of agricultural products. Study on plant quarantine laws in Ukraine and familiarization with foreign experience that the regulation in phytosanitary field.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of EPP**

**Integrated plant protection.** The discipline studies the strategy and tactics of integrated protection of phytocoenoses from biotic, abiotic and anthropogenic factors on the nature-based basis. It takes into account modern and up-to-date monitoring systems for beneficial and harmful biodiversity in accordance with the phases of growth and development of protective plants.

**External and internal plant quarantine.** The course examines the procedure of phytosanitary control of import and export objects adjustment at the state border of Ukraine, at home to prevent the importation into the country of quarantine organisms. And organization, methods, timing control surveys farmland to detect quarantine organisms.

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**Methods for inspection and examination of objects of regulation.** The most responsible chain system of quarantine measures is to determine the quarantine status of goods imported from abroad, determined the review and phytosanitary examination. Mastering the technique of detection of quarantine and other hazardous pests, plant diseases and weeds, mastering the methods of production micropreparations, storage of samples and prevention of quarantine rules. methods of inspection and sampling of the regulated objects, vehicles and phytosanitary examination method of considering diversity import-export trading.

**Quarantine pests.** The main goal of discipline is to study the biology of quarantine features species of insects, diseases, weeds missing in Ukraine, scientific substantiation of pest risk in case of delivery and possible acclimatization in our country, their harmful for agriculture, forestry and landscape management, potential environmental and economic damages as a result of their life.

**International phytosanitarian standards.** Discipline studies the types of modern international phytosanitary standards and purposes of their creation, application and use.

**Disinfestation of Management objects.** Foresees the study of technologies of disinfection of imported vegetable materials and plant products with the purpose of prophylaxis or eliminations of quarantine species while export-import trading operations.

**Disinfestation of Management objects.** Foresees the study of technologies of disinfection of imported vegetable materials and plant products with the purpose of prophylaxis or eliminations of quarantine species while export-import trading operations.

**Quarantine pest risk evaluation.** The harmful organisms of plants can make a risk which is added an estimation. He can be decreased by introduction of the technically grounded phytosanitary measures which will influence minimum on the free trading plants and plants materials.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### ***Optional Block 1 "Quarantine of Plants"***

**Adventive pests.** Discipline foresees the capture of student knowledge of distribution geography of adventive harmful organisms with the purpose of their identification and express-diagnosis of harmful organisms.

**Geography quarantine organisms.** Study centers of origin of pests and climatic conditions in which these species live in phytocenoses. Possible ways of their settlement and entry into Ukraine.

**Harmful organisms Ukraine in the international phytosanitary.** We consider the species that may be harmful to other countries. In case of detection in plant production need additional treatments.

**Quarantine of forest crops** The course involves the study of biological peculiarities of regulated pests of forest and wood products, ways of distribution and products, which may enter the territory of Ukraine; methods of survey of forest plantations, inspection of forest materials for the detection of forest quarantine organisms and sampling methods; integrated management of harmful organisms in forestry.

**Radio control of food products** The main disciplines are radio control of food products, which must be carried out from behind the cordon, instead of radionuclides in food products, water sports, drinking food.

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## **FACULTY OF LIVESTOCK RAISING AND WATER BIORESOURCES**

**Dean** – Kononenko Ruslan Volodymyrovych, Associated Professor, Candidate of Veterinary Science

Tel.: (044) 527-82-58 E-mail: animal\_science\_dean@nubip.edu.ua

Location: Building № 1, Room. 34

Faculty organizes and coordinates the educational process of master training and educational programs within specialties:

### **Specialty 204 "Technology of production and processing of livestock products"**

#### ***Educational program "Technology of production and processing of livestock products"***

Guarantor of the educational and professional program – Mykhailo Sychov, Professor, Doctor of Agricultural Science Professor P.D.

Departments in charge of graduate training:

#### **Genetics, Breeding and Biotechnology of animals**

Tel.: (044) 527-82-30

E-mail: krozgen@ukr.net

Head of Department – Sergiy Ruban, Professor, Doctor of Agricultural Science Professor P.D.

#### **Milk and Beef Production Technology**

Tel.: (044) 527-83-93, (044) 527-82-32

E-mail: ugnivenko@i.ua

Head of Department – Ugnivenko Anatoly, Professor, Doctor of Agricultural Science Professor P.D.

#### **Pshenychnyi Department of Animal Nutrition and Feed Technology**

Tel.: (044) 527-85-55

E-mail: feeding\_animals@ukr.net

Head of Department – Mykhailo Sychov, Professor, Doctor of Agricultural Science Professor P.D.

#### **Horse Breeding and Beekeeping**

Tel.: (044) 527-82-68

E-mail: povoznikov@i.ua

Head of Department – Mykola Povoznikov, Professor, Doctor of Agricultural Science Professor P.D.

#### **Technology in poultry, pig and sheep farming**

Tel.: (044) 527-87-60, 527-84-78, 527-88-49

E-mail: vylykhach80@nubip.edu.ua

Head of Department – Vadym Lykhach, Professor, Doctor of Agricultural Science.

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## **Specialty 207 "Water Bioresources and Aquaculture"**

### ***Educational program "Water Bioresources and Aquaculture"***

Guarantor of the educational and professional program – Shevchenko Petro, Associated Professor, Candidate of Biological Science.

Departments in charge of graduate training:

#### **Aquaculture**

Tel.: (044) 527-89-65

E-mail: [aquaculture\\_chair@nubip.edu.ua](mailto:aquaculture_chair@nubip.edu.ua)

Head of Department – Vitaliy Bekh, Professor, Doctor of Agricultural Science,

#### **Ichthyology and Hydrobiology**

Tel.: (044) 527-86-83

E-mail: [rudykleuska@nubip.edu.ua](mailto:rudykleuska@nubip.edu.ua)

Head of Department – Nataliia Rudyk-Leuska, Associated Professor, Candidate of Biological Science.

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 204 "TECHNOLOGY OF PRODUCTION AND PROCESSING OF  
LIVESTOCK PRODUCTS"  
educational program "TECHNOLOGY OF PRODUCTION AND PROCESSING  
OF LIVESTOCK PRODUCTS"**

Form of Training:	Licensed number of persons:
– Full-time	90
– Part-time	60
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master's degree in "Technology of production and processing of livestock products"

**The concept of training**

The concept of Master's degree training level 204 with major in "Technology of production and processing of livestock products" is to have combined theoretical studies, practical training and research to build professional skills in modern energy-saving technologies of high-quality animal products.

The aim of the concept is to satisfy the need for professionals possessing systematic knowledge and ability to solve problems of innovative nature in the livestock industry; scientific basis of research, data acquisition and data statistical analysis; forecasting animal productivity, ability to use inbreeding, improve and create animal branches and species, preserve the gene pool, develop animal breeding programs; design animal feeding trials; be able to analyze, organize and process scientific information on standardized animal feeding; develop and introduce new animal husbandry systems and methods; control physical, chemical and biological environmental factors; perform testing and sanitary-hygienic evaluation of new fodder varieties and additives, processing equipment, animal care products and study their behavior to obtain from them the maximum number of products in terms of their genetic potential; develop various models of technological livestock production processes; analyze populations, species and types of farm animals, determine their and commercial value by origin, individual qualities and progeny; optimize livestock breeding programs; manage milk production of cows based on deep knowledge of lactation physiology, dairy cattle husbandry, specifics of feeding high production cows, processing equipment of dairy companies and intensive technologies of breeding of young cattle stock, management and marketing principles of dairy farming; stimulate egg production of poultry, sheep wool production, yield of bee families, meat productivity of cattle, pigs, chickens and other farm animals; know how to use milk stimulants; manage meat productivity of cattle under market conditions of the industry based on a profound knowledge of beef cattle biology, husbandry and feeding systems, features of breeding environmentally friendly beef; develop competitive pig production and processing technologies; be able to maintain the modern production process and primary processing of table eggs and poultry meat, poultry marketing system; manage processes of procuring voluminous forage, preparation of animal feed and feed additives and know methods of their effective use to feed ruminants and monogastric animals; estimate and

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predict efficiency of farm animals, evaluate genetic resources in the riding, trotting and draft horse breeding, their rational use in the racing industry, equestrian sport and non-traditional horse breeding, possess the skills of implementing modern methods of experimental studies.

### **Educational and professional program of master's training**

#### ***Optional Block "Special livestock breeding"***

Specialization aims to provide students with knowledge and skills for the conservation, breeding and management of wild and exotic animals both in their natural existence (hunting, nature reserves, etc.) And in captivity (kennels game animals, kennels exotic animals, zoos, etc.). Students will learn modern methods of genetic information preservation of rare and endangered species, their reproduction, introduction to nature and adapt to new conditions. Within this specialization, students will receive additional knowledge in four subjects: "Biology of wild and exotic animals", "Management biocoenosis", "Technology wildlife protection", "Technology introduction and breeding animals".

#### **Areas of employment of graduates**

After learning professionals can work managers, technologists and managers of nature reserves, the hunting farms, nurseries hunting and exotic animals, zoos; staff of research institutions engaged in the study of biological and economic useful properties of wild animals, including candidates for domestication, commercial breeding farms or relocation to new, non-traditional for them, climatic conditions.

#### ***Optional Block "Animal Feeding"***

Students learn how to manage a technological process of bulky feed harvesting, producing animal feed and feed additives and methods of their effective use in feeding ruminant and monogastric animals. Students also learn specific animal feed, how to analyse, systemize and process information on standards of animal feed. Students will be able to solve problems in practice while producing and processing of quality and biological safe products of livestock and effectively use obtained knowledge and skills technologies.

#### **Areas of employment of graduates**

On completing the course graduates will be able to work at livestock enterprises, commercial firms which specialize at selling feed and to provide advice on animal feeding.

#### ***Optional Block "The racing industry and sport horse breeding industry"***

The master's degree program provides specialist with knowledge in the field of breeding and feeding horses of various breeds and is aimed at studying racing industry, sports, organization of small and medium-sized businesses in the context of the industry's future development.

#### **Areas of employment of graduates**

After having successfully completed the master's degree program, the specialists can apply for employment with public and private breeding enterprises, zonal research institutes and stations, at racetracks and in equestrian centers, tourist bases and medical centers and may also apply for and attend graduate school.

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***Optional Block "Technologies productive use of the capacity of bees"***

The program focuses on studies in biology of bee colonies, basics of honey bee genetics, selection work in apiculture industry, bee breeding, breeding of queen bees and inseminating them to use breeding material for increasing productivity of bees and entomophile crops through their pollination. The students enlisted in this program acquire deep knowledge in assessing nectar resources and ability to efficiently use them for improvement of honey harvest and various bee products, effectively use bees for pollination of crops. They will be able to introduce mechanization in bee production processes, know how to handle tools, equipment and automation means to maintain and reproduce bee colonies and reproduce breeding material; operate apiculture facilities. The students under this program will also acquire extensive knowledge about origins, composition, properties and processes of apiculture products and their manufacture, processing and storage processes, standardization and implementation in accordance with market needs.

**Areas of employment of graduates**

After having successfully completed the master's degree program, the specialists can apply for employment with the leading bee-breeding enterprises, NAS and NAAS of Ukraine's scientific research institutions.

***Optional Block "Save and use of breeding resources"***

The main objective of the master program is to train specialists in animal breeding who are able to work in the Agency for Animal Identification at the Ministry of Agrarian Policy of Ukraine or its regional branches, in the Chief State Breeding Inspectorate of the Ministry of Agrarian Policy of Ukraine or its regional branches, in research institutions, in breeding farms dealing in setting up, improvement or breeding dairy, dual-purpose and beef cattle, pigs, sheep, goats, poultry and horses.

**Areas of employment of graduates**

Upon completing of the master's degree program, the managers/ specialists licensed to produce and process, improve and develop animal products can work in public and private breeding farms, provincial and district departments of agriculture, agriculture breeding centers of different levels, as heads of agricultural enterprises and also in higher educational institutions of I-II accreditation levels and in academic schools.

***Optional Block "Reproductive bioengineering"***

The aim of the program is to give knowledge about researches, achievements of contemporary embryology and biotechnology, to provide students with knowledge about animal breeding and selection, genetic and cell engineering, genomics and proteomics, new biological material and technologies of training specialists able to solve key problems of modern life such as to provide sustainable development and increase life quality with the help of increasing animal food products.

**Areas of employment of graduates**

A Master of "Reproductive bio engineering" is able to work in scientific and research organizations of NAAS of Ukraine, enterprises which produce livestock products and are able to continue their education as postgraduate students.

***Optional Block "Dairy cattle breeding"***

This program provides students with modern deep knowledge of dairy cattle breeding under industry market conditions.

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### **Areas of employment of graduates**

After completion of the master's program the specialists/ managers can work in livestock production enterprises of different ownership forms, at II level of accreditation higher education institutions, NAAS of Ukraine's research institutions and apply for the post-graduate studies in graduate schools.

### ***Optional Block "Specialized beef cattle"***

Lack of Ukraine in the specialized beef cattle, low efficiency and high cost of imports necessitated the creature of meat species taking into account conditions soil-climatic zones. Organized commodity beef cattle. Under these conditions, the role of beef production engineers who have to master the system of practical and theoretical knowledge and skill to use them in their work.

The aim is that based on the knowledge of specialized features cattle meat breeds will be master mastered the theory and practice of environmentally friendly beef production and obtaining highly productive pedigree animals.

### **Areas of employment of graduates**

After graduation, professional managers can work in enterprises with livestock production of various forms of ownership, higher educational institutions I-II levels of accreditation, research institutions NAAS of Ukraine and are entitled to admission to graduate school.

### ***Optional Block "Technology management in pig farming"***

The master's degree program considers the issues related to development of body systems and organs during ontogenesis, characteristics of gestation, generative processes, lactation and energy metabolism and thermoregulation in pigs; breeding biology; behavior of different gender and age groups; adaptation to the environment. The students also examine the issues of animal herding and selection, pure breeding and crossbreeding methods, hybridization and large-scale breeding; methods and ways of identifying estrus cycle in sows; breeding boars and sows; exploitation of breeding boars, methods of obtaining and preparing boar semen, artificial insemination.

### **Areas of employment of graduates**

After having successfully completed the master's degree program, the specialists licensed to produce and process, improve and develop animal products can apply for employment with livestock production enterprises of different ownership forms, at higher education institutions of I and II accreditation levels, NAAS of Ukraine's research institutions as well as apply for the post-graduate studies in graduate schools.

### ***Optional Block "Modern technologies of industrial poultry"***

The master's degree program provides students with the opportunity to obtain knowledge in biology of chickens, turkeys, ducks, geese, quail, guinea fowl, ostriches and morphophysiological patterns observed in growth of different bird species and to acquire skills of poultry breeding, egg incubation, feeding poultry and egg and poultry meat production by using modern technology and latest equipment, subject to strict observation of veterinary and sanitary measures and quality control through current poultry husbandry management system.

### **Areas of employment of graduates**

After having successfully completed the master's degree program, the professionals can apply for employment with poultry breeding enterprises of different ownership forms,

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poultry incubation stations, poultry farms, animal feed mills, in the higher educational institutions of I-II accreditation levels, research institutions as well as apply for the post-graduate studies in graduate schools.

***Optional Block "Technologies in rabbit breeding and bestiality"***

Provides the formation of students' modern knowledge about the biological characteristics of minks, nutria, polar foxes, foxes, rabbits. The program involves the study of modern technologies in rabbit breeding and fur farming, which ensure the production of high quality products, its primary processing and in-depth processing. Much attention is paid to departmental standards of technological design of rabbit and animal farms, as well as the study of design documentation for the construction and reconstruction of rabbit and animal farms.

**Areas of employment of graduates**

After graduation, specialists in the right of production and processing of livestock products, its improvement and development can work at enterprises producing rabbit products and fur farming of various forms of ownership, in higher educational institutions of I-II levels of accreditation, research institutions of NAAS of Ukraine and have the right to enter graduate school.

***Optional Block "Technologies of sheep and goat breeding"***

This block provides students with the opportunity to obtain knowledge in a subject of both sheep and goat biology and morphophysiological patterns of their growth. Students acquire professional skills in stockbreeding, stock reproduction, raising young animals. They learn about producing competitive products with the application of modern technology and the latest equipment. System of veterinary sanitary measures and product quality control goes along with advanced methods of management in running an enterprise.

**Areas of employment of graduates**

Young professionals can find employment in enterprises of different forms of ownership, which specialize in stockbreeding of sheep and goat products. Also, they may join higher educational institutions of I-II level of accreditation, research institutions, and have the right to apply for the postgraduate school.

**Practical training**

The aim of practical training is to provide students with knowledge in modern methods, organization forms and tools they can use in their future profession, make them build knowledge and skills based on the knowledge base they have acquired in the University sufficient to make independent decisions in specific lines of work under real market conditions, educate in them the need for regularly replenishing their knowledge and applying it in practice.

Practical training is continuous and consistent and the students undergoing this it obtain the desired scope of practical knowledge and skills as required by qualification of the master's degree.

The main objective of practical training is to consolidate and expand students' theoretical knowledge and their practical skills in organization and management of basic agricultural production processes, and in scientific research.

While studying at the University, the students receive profound theoretical and practical training in modern laboratories equipped with new equipment, computer classes, as well as at the leading animal breeding enterprises, such as IP NUBiP of Ukraine

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"Agronomic Research Station," "O. Muzychenko Velykosnitynske NDH," "NDH Vorzel," SP "South Crimean Sheep Breeding," PE "Borodino-A," FE "Merino-Zahid," pig breeding complex "Agroprime," AASO Agrokombinat "Kalita", JSC "Agro-Soyuz," Dibrovsky Stud Farm 62, Stud Farm "Shakhtar", JV "NIBULON," FE "Nina," FE "Medovi Polia," Pedigree Bee Breeding Farm "Pribuzki Medobory," JSC "Med Podillia," JSC "Poultry Farm Kiyvska," JSC "Nadia," SE "Nova Peremoha," CJSC "Complex Agromars" and others.

### Proposed Topics of Master's qualification Thesis

1. Optimization of cattle feeding techniques.
2. Improvement of replacement heifer nutrition.
3. Productiveness of quails at different levels of fat in feed.
4. Growth and utilization of feed nutrients in rabbits at different levels of fiber in their diet.
5. Effective use of enzymes in poultry nutrition.
6. Improvement of compound feed and premixes' recipes to ensure adequate nutrition of pigs.
7. Better exploitation of sows in conditions of using industrial technologies.
8. Comparative evaluation of performance exhibited by pigs of different genotypes in conditions of using industrial technologies.
9. Effect produced by milk production level on cow reproductive abilities.
10. Assessment of individual cow behavior elements during their milking with milking robots.

### Curriculum of Master training in educational program "Technology of production and processing of livestock products" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Pedagogics	4	exam
CC 2	Processing of products of animal origin	5	exam
CC 3	Business activity in livestock	4	exam
CC 4	Foreign language	4	exam
CC 5	Methodology and organization of scientific research on the basics of intellectual property	4	exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6	Biological productivity of farm animals	4	exam
CC 7	Animal nutrition and feed quality	4	exam
CC 8	Modern trends of selection in animal husbandry	4	exam
CC 9	Modeling of technological processes in animal husbandry	4	exam
CC 10	Process control in livestock	5	exam
CC 11	Production Practice	10	exam
CC 12	Certification exam	1	exam
CC 13	Preparation and defense of qualification master's thesis	9	

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
<b>Optional components of EPP</b>			
<b>Free choice according to speciality</b>			
<i>Optional Block 1 «Special livestock breeding»</i>			
OC 1.1	Biology of wild and exotic animals	5	exam
OC 1.2	Management of biocoenosis	5	exam
OC 1.3	Technology to protect wildlife	5	exam
OC 1.4	Technology introduction and breeding animals	5	exam
<i>Optional Block 2 «Animal Feeding»</i>			
OC 2.1	Evaluation of the quality and nutritive value of feeds	5	exam
OC 2.2	Feeding of ruminant animals	5	exam
OC 2.3	Feeding monogastric animals and poultry	5	exam
OC 2.4	Feeding fish	5	exam
<i>Optional Block 3 «The racing industry and sport horse breeding industry»</i>			
OC 3.1	Global genetic horses resources	5	exam
OC 3.2	Racetrack and sports training	5	exam
OC 3.3	Horse-breeding	5	exam
OC 3.4	Horse biology	5	exam
<i>Optional Block 4 «Technologies productive use of the capacity of bees»</i>			
OC 4.1	Biology of bees	5	exam
OC 4.2	Breeding and keeping of bees	5	exam
OC 4.3	Production, storage and processing of bee products	5	exam
OC 4.4	Technological equipment in beekeeping	5	exam
<i>Optional Block 5 «Save and use of breeding resources»</i>			
OC 5.1	Management of the selection process in livestock	5	exam
OC 5.2	Keeping of livestock genetic resources	5	exam
OC 5.3	Biotechnology of animal reproduction	5	exam
OC 5.4	Genetics of quantitative and qualitative characteristics of animals	5	exam
<i>Optional Block 6 «Reproductive bio engineering»</i>			
OC 6.1	Contemporary methods of regulating animals reproductive capacity	5	exam
OC 6.2	Biotechnological methods in livestock raising	5	exam
OC 6.3	Conservation of livestock genetic resources	5	exam
OC 6.4	The genetics of qualitative and quantitative features	5	exam
<i>Optional Block 7 «Dairy cattle breeding»</i>			
OC 7.1	Physiology of lactation	5	exam
OC 7.2	Management of milk productivity	5	exam
OC 7.3	Intensive technologies of rearing young cattle stock	5	exam
OC 7.4	Management and marketing in dairy farming	5	exam
<i>Optional Block 8 «Specialized beef cattle»</i>			
OC 8.1	Management of productivity	5	exam
OC 8.2	Control of production of products beef cattle	5	exam
OC 8.3	Processing beef cattle	5	exam
OC 8.4	Production of ecologically pure beef	5	exam
<i>Optional Block 9 «Technology management in pig farming»</i>			
OC 9.1	Biology of the pigs	5	exam
OC 9.2	Management of feeding and housing pigs	5	exam
OC 9.3	Slaughtering pigs and pig of products processing	5	exam
OC 9.4	Industrial pig production technology	5	exam
<i>Optional Block 10 «Modern technologies of industrial poultry»</i>			
OC 10.1	Technology of production of eggs and meat	5	exam
OC 10.2	Breeding business	5	exam
OC 10.3	Incubation of the birds eggs	5	exam
OC 10.4	Bird biology	5	exam
<i>Optional Block 11 «Technologies in rabbit breeding and bestiality»</i>			

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 11.1	Biology of rabbits and fur animals	5	exam
OC 11.2	Management of feeding rabbits and fur animals	5	exam
OC 11.3	Modern technologies in rabbit breeding and fur farming	5	exam
OC 11.4	Breeding in rabbit breeding and fur farming	5	exam
<i>Optional Block 12 «Technologies of sheep and goat breeding»</i>			
OC 12.1	Biology of sheep and goat	5	exam
OC 12.2	Technologies of production sheep and goat products	5	exam
OC 12.3	Sheep and goat stockbreeding	5	exam
OC 12.4	Reproduction of sheep and goats	5	exam
<b>Total</b>		<b>20</b>	
<b>The total amount of compulsory components</b>		<b>62</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OFF EPP</b>			<b>90</b>

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Pedagogics.** Generates future specialists professional (general pedagogical) knowledge and skills that are in knowledge about the nature of learning, education and training, the main directions and principles, methods and forms of education and training, the principles of forming the content of education and training; approaches to evaluating the success of the training, skills characterize the organization of educational and training process.

**Technology of production and processing of livestock products.** Students learn how to produce and process products of cattle, pigs, poultry, beefarming, sheep and goats, rabbits and fur farming.

**Organization of agribusiness.** This discipline examines the economic substance, specifics of setting up and developing enterprises and businesses, an enterprise as part of business; type of management, business characteristics and functions; economic and legal foundations of business; legal forms of economic activities in agribusiness; business planning at enterprises; cost-effectiveness of small and medium business and methods of its assessment.

**Production management in livestock.** This course will provide with theoretical knowledge and practical skills of production management that is how to develop an enterprise strategy, to analyze projects and methods of evaluation of their effectiveness, how to manage capital investment using the most effective tools of activities to get profit as well as to increase social effect, the value of assets and own capital.

**Methodology and organization of research with the principles of intellectual property.** The aim of the discipline is formation of the system of knowledge in methodology, theory of method and research process, methodical support of scientific and research activity at the stages of preparation of a Master paper, formation of the ability to organize research of a specific issue using the whole complex of the traditional methods of research including general and special methods. The main task of the theoretical part of the course is introduction to students the current concepts of research creation, the principles of methodology of scientific perception and methods of research. The main task of the practical part is the development of self-education ability, mastering skills of formation and application of perceived methodological position of research. In case of mastering the course students have to improve their skills of search, assortment and processing of scientific information, accurate formulation of a problem, aim, task, object,

subject, methods of research. Introduction to students the principles of intellectual property and direction of them to gain knowledge and skills concerning registration of rights of ownership, their protection, commercialization, estimation and management are envisaged.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of EPP**

**Biological productivity of farm animals.** This discipline allows students to capture extensive knowledge of the problems related to digestion, physiological and biochemical mechanisms of nutrients' transformation in feed ingredients of milk, meat, eggs, wool; control methods and ways by which biologically active substances affect biosynthetic processes in animal tissues. It examines theoretical aspects of hydrolysis mechanisms and transport of proteins, fats, carbohydrates, aminoacids, macro-and microelements in the gastrointestinal tract, the impact of biologically active substances and growth promoters on those processes, and the ways of nutrients transformation in feed constituents of milk, meat, eggs, wool; control methods and ways of improving animal productivity.

**Animal nutrition and feed quality.** The discipline is aimed at creating a system of knowledge and skills of managing planning, production and use of basic feed varieties used in animal nutrition. The discipline curriculum provides for the study of bulky fodder process and operation control system; cattle, sheep and horse feeding systems; management of animal feed and feed additives production and operation system; pig and poultry farming feed systems; information technology used to optimize calculated consumption of animal nutrition.

**Modern trends of selection in animal husbandry.** The objective of discipline is to help students to master the breeding theory to identify promising areas of animal husbandry and skills of applying animal assessment, screening and breeding methods in practice. It examines the methodology of selection process in animal husbandry, methods of measuring or determining the main selection parameters. The students examine the issues of using achievements made by population genetics in animal breeding; theoretical basis of selection; animal evaluation and selection methods; inbreeding and heterosis; selection and breeding. The students also learn the features of breeding milk and meat cattle, pigs, sheep, horses and poultry.

**Modeling of technological processes in animal husbandry.** This discipline studies advanced technologies of livestock production, concepts of model and modeling, types of models and basic modeling stages, theoretical and practical methodological foundations, methods, and objects of modeling production processes; economic-mathematical models and modeling processes in animal husbandry by using a personal computer. The students are taught to master modern theoretical concepts of modeling, get acquainted with typical economic-mathematical models of technological processes and their practical application in a production environment.

**Process control in livestock.** The subject aims at highlighting the essence of process control as part of production technology and production management in livestock. It considers the basic principles of manufacturing processes in space and time, the stages of calculating the parameters of line production, principles of organization and planning workflows and system of "standard operating procedures" in various fields of animal husbandry. It reveals the basic approaches to operational process control in livestock systems in the context of "management based on deviations" and determine the critical control points in the processing chain, shows the basic structure and functionalities of modern automated process control systems.

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**Optional components of EPP**

***Free choice according to specialty***

***Optional Block 1 "Special livestock breeding"***

**Biology of wild and exotic animals.** It studies the biological characteristics of different wild animals and exotic species, including domestication candidates for their zoogeography, physiological features, ethology, patterns of individual development, especially the exterior, nutrition and reproduction, the nature of inheritance of certain traits and characteristics.

**Management of biocoenosis.** This discipline provides management expertise with unity of plants, animals and microorganisms coexist in natural or artificial areas (nature reserves, hunting, game kennels, zoos, unique reservoirs, etc.), including in the face of increasing anthropogenic pressure.

**Technology to protect wildlife.** It studies known technological solutions based on the interaction of legal, organizational, economic, logistical and other measures aimed at conservation, restoration and sustainable use of wildlife. Covers technology breeding rare or endangered species under natural and artificial conditions of existence and conservation technologies and long-term storage of genetic information.

**Technology introduction and breeding animals.** The course gives a special knowledge of techniques and methods of breeding of wild and exotic animals in nature reserves, game farms, nurseries hunting game, zoos, providing them expanded reproduction without increase in inbreeding as well as methods for introduction in the territory, monitoring as exotic species during their adaptation and continued existence.

***Optional Block 2 "Animal Feeding"***

**Evaluation of the quality and nutritive value of feeds.** The course provides theoretical and practical study on evaluation of feed quality, laboratory studies and different feeding groups based on their nutritional feed determination, practical and theoretical skills in decision making regarding the possibilities of using fodder in animal feed. The subject of the study is different feeding groups, their evaluation and determination of the actual nutritional value for animals and birds of different species.

**Feeding of ruminant animals.** The purpose of discipline is to help students develop a system of knowledge and skills in feeding ruminants as required by description of major discipline: "Technology of production and processing of animal products." The subject of study is to know techniques of feeding cattle, sheep and goats; use feed products, diets, ensure nutrition adequacy, quality and safety; prevent animal diseases.

**Feeding of monogastric animals and poultry.** The objective of the discipline is to introduce the students to specifics of feeding monogastric animals and poultry; modern approaches to regulation and organization of animal feeding. The object of study is nutrition of hogs, horses, poultry, fur animals; feeding of monogastric animals; quality of products depending on nutrition by highlighting theoretical and practical aspects of monogastric animal feeding scientific basis; feeding of pigs and horses; feeding of poultry, rabbits, nutria (European beaver) and fur animals.

**Fish feeding.** The course aims at studying the characteristics of fish nutrition, nutritional assessment of feeds, their classification and use of feed and feeding normalized different species of fish. The course consists of two parts: the theoretical foundations of feeding and normalized fish feeding fish. The subject of the study is anatomical and physiological characteristics of digestion and metabolism and energy in fish feed and assessment of their quality, feeding carp, salmon, sturgeon and other species.

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*Optional Block 3 "The racing industry and sport horse breeding industry"*

**Global genetic horses resources.** It studies horse genetic resources as a factor of development of small and medium businesses. It considers characterization methods and improved conservation of genetic resources in horse breeding.

**Racetrack and sports training.** It studies the physiological bases sport horse breeds system factory and racetrack training rules test horses on the racetrack, racetrack use the results of tests in breeding work. The discipline compares the experience of Britain and the United States to improve technology and training thoroughbred horses.

**Horse-breeding.** It stu of heredityies variability of the main signs of breeding horses of different types and species, the relationship between the main selection signs of breeding, selection and selection features mares to stallions in the breeding horse breeding, methods of assessment of stallions and mares for breeding and quality of offspring horse breeding base in the country.

**Horse biology.** The course "Horse biology" studies biological characteristics of horses associated with their maintenance, feeding, reproduction, behavior, adaptation to living conditions and creating conditions of use and methods of improvement and the improvement of breeds of horses for various purposes, which will enable to more effectively conduct breeding work will provide quality improvement horse herd and economic efficiency of the industry and will not only provide internal needs of the state in breeding and working horses, but also supply them for export.

*Optional Block 4 "Technologies and productive use of bees capacity"*

**Biology of bees.** The discipline thoroughly studies the biology of honeybees functions of individuals, morphology, anatomy, physiology and ecology working bees and the drone of the uterus; master issues lifestyle patterns of social bees that functions that appear only as a result of living bees holistic biological units (families). These include phenomena - heat, building nests, a high increase in body mass, swarming, use medosbora, wintering and more. Knowledge of patterns of social life of bees is the foundation on which the possible development of effective techniques and methods of beekeeping.

**Breeding and keeping bees.** This discipline helps students to: study systems designed to monitor and sustain bees and their colonies, maintain them during the annual cycle; variability and heredity characteristics of individual bees and their colonies; organization and performance of breeding work in the industry; study theoretical foundations underlying natural reproduction of bee colonies and stasis bees, development and implementation on the basis of modern technologies and methods of breeding and bee breeding material output.

**Production, storage and processing of bee products.** This discipline introduces students to technologies of producing honey, wax, pollen (bee pollen), bee-glue, royal jelly and bee venom; biology and chemistry of honey, wax and other biologically active products' making process. The discipline allows students to study properties of biologically active products, their effect on quality of different factors and methods of determining fraud; organization of production at the apiaries of different ownership; definition of quality; measures of enhancing apiculture economic efficiency.

**Technological equipment in beekeeping.** The discipline the development of new and improvement of existing methods of automated control systems and technological production processes in beekeeping methods and algorithms of maintenance and repair of complex electromechanical and computer-integrated automation systems. It highlights of the main provisions of the production and exploitation of beekeeping equipment, wax raw materials processing, pumping, processing and packaging of honey, obtaining other bee

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products, queen bees breeding, disease control bees, bees mechanization of transportation, beekeeping buildings.

*Optional Block 5 "Save and use of breeding resources"*

**Management of the selection process in animal husbandry.** Students will obtain knowledge of principles of breeding in Ukraine and abroad, as well as the most advanced methods of evaluating quality breeding animals adopted and implemented in the world, based on these measures, aimed at increasing productivity in livestock populations.

**Conservation of genetic resources of livestock.** The program is designed to develop theoretical and practical knowledge of principles, methods to preserve the gene pool of farm animals. Students will learn about modern conceptual and methodological principles of conservation of genetic diversity of farm animals, which are based on a complex combination of breeding, genetic, biotechnological and organizational measures and will be able to apply the knowledge and abilities. The main objective of this course is to teach future specialists to balance the actual ultimate goal of breeding animals with desirable genotype projected economic and biological indicators of performance.

The task of the discipline is to provide students with theory and practice of improving existing and creating new herds and breeds of farm animals which are more highly productive and better adapted to modern technology of livestock production.

**Biotechnology of animal reproduction.** The discipline allows students to master the latest knowledge and achievement in reproductive biotechnology for intensification of breeding genetically valuable animals to promote selection and enhance livestock productivity and improve its reproductive functions. It examines theoretical and practical bases of embryobiotechnology in farm animals breeding industry, oogenesis, fertilization, embryogenesis, chimerism, transgenesis, cloning, sex determination and their importance for animal breeding; the use of DNA technology in farm animals breeding; identification of animals who are carriers of lethal mutant genes.

**Genetics of quantitative and qualitative characteristics of animals. This course aims** at studying patterns of inheritance of traits. Students will become familiar and learn how to work with basic database of quantitative traits QTL of different species. After completing the course, students will be able to select different species of animals which is aimed at breeding work in herds based on different types of genetic markers.

*Optional Block 6 "Reproductive bio engineering"*

**Contemporary methods of regulating animals reproductive capacity.** Students will learn how to implement new technologies and methods of evaluation and improvement of animals reproductive capacity which are based on modern methods forms and means of diagnosis and enhancement this function.

**Biotechnological methods in livestock raising.** Students will learn about biotechnology of animal reproduction, its physiological features and deviation, its dependence on feeding, care and use, the impact of endogenous and exogenous factors. They will study artificial insemination, embryo transplants, cloning, genetic engineering, they will consider questions about sterility prevention, directed regulation of reproductive functions of animals.

**Conservation of livestock genetic resources.** Students will learn about how to preserve and use rationally livestock resources, to organize breeding of commercial and local breeds, how to do accounting and registration of animals, to evaluate the efficiency of breeding activities, to prognose a breeding success, to determine the impact of various factors on animals productivity.

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**The genetics of qualitative and quantitative features.** Students will learn about applied genetics which will help them to do their scientific and research work effectively in future in order to enhance animals productive and reproductive capacity.

*Optional Block 7 "Dairy cattle breeding"*

**Physiology of lactation.** The discipline aims at studying origin and types of breast function of secretory cells of the breast, the biosynthesis of the major components of milk, regulation of secretion and excretion of milk, the interaction of the breast to other body systems, laws of regulating lactation in ruminants, evaluation of the growth and development of breast, affect their growth and create optimum conditions for maximum manifestation processes of milk and milk excretion reflex.

**Management milk production. This course aims at** acquiring knowledge system of scientifically grounded control milk production by genetic factors and organization of modern operation process of milk production; future specialists will be able to effectively measure to ensure receipt in market conditions.

**Intensive technologies of rearing young cattle stock.** The discipline allows students to study the intensification level of animal body growth, development and formation at the early stages of ontogenesis and the influence produced by environmental factors on the process of breeding production animals.

**Quality management in the dairy sector.** The course studies modern methods of quality control. The student should know the requirements for the quality of raw milk provided by the current legislation in Ukraine, to be able to assess its compliance with the requirements, to take the necessary measures for non-compliance of products with specified requirements.

*Optional Block 8 "Specialized beef cattle"*

**Management of productivity.** The discipline provides deep knowledge of patterns of individual animals specialized meat breeds that will allow future professionals to manage production of cattle meat during its growing and fattening in order to obtain cheap quality beef. The student should acquire knowledge about the characteristics of the waste animal genetic potential productivity patterns of individual development of animal feed, depending on age, performance and physiological status and be able to apply them in practice in order to increase beef production.

**Control of production of products beef cattle** The discipline involves the provision of theoretical knowledge regarding the selection of new forms and methods of control when creating an integrated, efficient and flexible production of beef cattle to market conditions. Knowledge management theory will enable to master the art of team management, including the ability to set general and specific goals and objectives of the company, to develop a management strategy with regard to social, collective and personal interests, monitor their implementation.

**Processing beef cattle.** The discipline involves studying the problems of formation of quality and process performance characteristics of meat animals as raw materials for the processing industry, the implementation of cattle for meat processing companies for the existing systems and regulatory documentation, technology, processing and storage of slaughter animals with a maximum yield of useful products for manufacturing, evaluation of beef quality indicators for its technological and culinary properties and methods of preserving meat and meat products from it to improve the quality of long-term storage.

**Production of ecologically pure beef.** The course examines the requirements for the production of quality and safe beef, sets technical standards and rules of hygiene to obtain, from the growing of calves and young beef breeds and their crosses and finishing of cattle at processing plants and meat in the retail trade.

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*Optional Block 9 "Technology management in pig farming"*

**Biology of the pigs.** Examines issues such as the development of systems and organs during ontogenesis, especially gestating, generative process, lactation, metabolism and energy and thermoregulation pigs, breeding biology and behavior of different gender and age groups, adaptation to the environment. The main objective of the course "Biology pigs" - a study of the vital processes of individual organs, systems and whole body, allowing you consciously change them in the right direction for the man.

**Management of feeding and housing pigs.** The course combines a set of sciences studying and planning features of pigs feeding and maintenance, watering, maintenance of microclimate, manure removal and disposal of manure disinfection of others. Also considered regulations that govern the use of an equipment for feeding and pigs and how to accommodate depending on the technology of pork production.

**Slaughtering of pigs and processing of pig products.** The discipline allows the students to master methods of slaughter products' rational management; methods of slaughtering pigs and processing pig products. It also examines preparation, pre-processing and storage of raw pig products, pig transport, morphological and chemical composition and factors affecting the quality of meat.

**Industrial pig production technology.** The discipline cultivates the ability to implement rational use of various modern technologies of industrial pork production on an industrial basis. It considers the characteristics of one-, two- and three-phase technology of pork production, bioengineering systems in pig farming.

*Optional Block 10 "Modern technologies of industrial poultry"*

**Technology of production of eggs and meat.** The discipline studies maintenance of modern process of production and primary processing of eggs, which is based on the use of specialized egg and cross breeds of birds using complete feed, complete mechanization and automation of the production process, while respecting the system of veterinary-sanitary measures and quality control.

**Breeding business.** Studies breed poultry, methods of selection and breeding of poultry breeding farms types, and especially breeding of egg and meat chickens, turkeys, ducks, geese, quails, guinea fowl and ostriches.

**Incubation of the birds eggs.** It studies rules of obtaining standard hatching eggs, the storage and transportation, processing methods incubation eggs regime and biological control. Master acquires skills of organization and planning process technology incubation, and learns causes of disorders in embryos and methods for their prevention.

**Bird biology.** The course examines the structure and functions of individual organs and systems of birds in general. The knowledge about the circulatory, respiratory, digestive, metabolic and energy, thermoregulation, reproduction, neuro-humoral regulation of various processes enable technologists poultry companies maintain a high level of productivity of poultry.

*Optional Block 11 "Technologies in rabbit breeding and bestiality"*

**Biology of rabbits and fur animals.** Provides knowledge of the structure of the skeleton, muscles, circulatory, digestive, nervous and genital systems, skin and hair; features of hair formation and growth of fur animals and rabbits; study of color forms of minks, ferrets, foxes, polar foxes, raccoons, nutria, muskrats.

**Management of feeding rabbits and fur animals.** Study of the needs of fur animals and rabbits in nutrients; features of feeding minks, polar foxes, ferrets, foxes, raccoons, nutria, muskrats, chinchillas and rabbits; technology of preparation of forages for fur animals and rabbits.

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**Modern technologies in rabbit breeding and fur farming.** Students mastering theoretical knowledge and acquiring practical skills in the technology of breeding fur animals and rabbits, studying housing systems, requirements for the territorial location of farms, production facilities and structures, designing farms for breeding fur animals and rabbits.

**Breeding in rabbit breeding and fur farming.** Study of reproduction features and methods of breeding minks, foxes, ferrets, foxes, raccoons, nutria, muskrats, chinchillas and rabbits; preparation and conduct of breeding, breeding of young stock after weaning; organization of breeding work in animal husbandry and rabbit breeding.

*Optional Block 12 “Technologies of sheep and goat breeding”*

**Biology of sheep and goat.** During this course, students learn the general structure and functions of separate organs and body systems of both sheep and goats. Also, it gives knowledge regarding animal ethology and bioclimatology, hierarchy inside a flock, adaptation, and stress.

**Technologies of production sheep and goat products.** This subject teaches the modern production technologies of both primary and advance processing of wool, lamb and mutton meat, sheep and goat milk; technologies of production, primary processing, and sheepskin manufacturing processes; production system of feeding, care, and treatment of livestock of different sex and age groups.

**Sheep and goat stockbreeding.** This discipline teaches breeds, spreading, and breed regionalization of both sheep and goats, theoretical principles of selection and breeding methods of both sheep and goats. Also, it covers the organization of the breeding process on farms of different types.

**Reproduction of sheep and goats.** This discipline provides knowledge about individual aspects of both sheep and goat reproduction physiology. Also, it shows ways of reproduction intensification: extension of productive use of animals, selection for multiple lambing. A master student acquires skills of organizing and planning of shearling tup, lambing, young-stock raising.

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**Training of masters of sciences  
in branch of knowledge "Agricultural science and food"  
in specialty 207 "WATER BIORESOURCES AND AGUACULTURE"  
educational program "WATER BIORESOURCES AND AGUACULTURE"**

Form of Training:	Licensed number of people:
– Full-time	75
– Part-time	75
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Aquatic Bioresources and Aquaculture

**The concept of training**

In the process of their studies, the specialists in water bioresources learn biological resources of the hydrosphere: production of aquatic resources, productivity, raw water resources. They also study dynamics, abundance and biomass of aquatic organisms, fish productivity of water bodies, dynamics of fishing hydrocole (fish), predicting abundance and biomass of aquatic resources and levels of allowable catch. As a result, the students acquire technology of rational (sustainable) management of aquatic resources in fishery ponds.

Over the course of their training, the specialists in aquaculture study and master the techniques of artificial breeding and reproduction of aquaculture industrial facilities and production as well as technologies of restoring native, rare and endangered hydrocole (fish) species. By the end of the course, the students acquire the techniques of artificial and natural reproduction and production of aquatic resources in fishery ponds.

Finally, the future experts on protection, reproduction and rational use of hydro-bioresources acquire knowledge of hydrocole (fish) selection methods applied for their protection. They also study technologies used to protect and restore native, rare and endangered hydrocole (fish), as well as rational (sustainable) use of aquatic resources, predicting their abundance, biomass and levels of allowable catch. As a result, the master degree candidates acquire the techniques of artificial and natural restoration and protection of native, rare and endangered aquatic resources (AR) in fishery ponds.

**Educational and professional program of master's training**

***Optional Block "The fauna of the wetlands"***

The task of this master's program is to train specialists who will be able to work in the system of Ministry of Environmental Protection of Ukraine or in the system of State cominttee of fishery of Ukraine in oblast or district fishery protection bodies, in scientific and research enterprises which grow, protect and restore rare os extinguishing fish species, moving them into waters in order to restore biological variety, enhance bio and fish productivity of water eco systems. It is possible on the basis of scientific verification of main approaches to optimize rational water use and utilization of water bioresources and to develop specific measures to protect water biovariety its increasing and rational use.

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### **Areas of employment of graduates**

On completing this program, specialists can apply for employment at State Department of Fisheries of Ukraine, Department of Aquatic Biological Resources Protection, Reproduction and Regulation of Fisheries in Kyiv Oblast, territorial (oblast and district) fishery protection bodies, territorial agencies of Ministry of Environmental Protection of Ukraine, Research Institute of Fisheries of NAAS of Ukraine, Institute of Hydrobiology of NAS of Ukraine and other scientific and research enterprises, at public and private fishery farms in harvesting commercial hydro bioresources of waters.

### ***Optional Block "Protection and productivity of hydrobioresources"***

The main objective of the master's degree program is to prepare specialists of environmental protection who are able to work in the agencies under jurisdiction of the Ministry of Environment or the State Department of Fisheries of Ukraine, oblast or regional fisheries departments, in research institutions, public or private enterprises, whose business relates to protection and reproduction of rare and endangered fish species, moving them into the water in order to restore biodiversity, increasing biological and fish productivity of aquatic ecosystems. Implementation of these measures is based on the scientific substantiation of the main approaches used to optimize efficiency of water use and commercial utilization of water resources and on development of specific measures for protection of aquatic biodiversity, increasing its abundance and sustainable use.

### **Areas of employment of graduates**

After having successfully completed the master's degree program, the specialists can apply for employment with the State Department of Fisheries of Ukraine, Department of Aquatic Biological Resources Protection, Reproduction and Regulation of Fisheries in Kyiv Oblast, territorial (oblast and district) fishery protection bodies, the territorial agencies of the Ministry of Environmental Protection of Ukraine, Research Institute of Fisheries, NAAS of Ukraine, the Institute of Hydrobiology, NAS of Ukraine, public and private fishery farms; the State Fishery Inspection in Kyiv and other Ukrainian Oblasts.

### ***Optional Block "Harvested biological resources"***

The aim of the program is to teach specialists in rational harvesting biological resources who will be able to work in the system of State agency of fisheries of Ukraine and regional and district ichthyological services, in scientific and research enterprises in state and private fisheries which harvest hydrobioresources out of the natural waters. Students will obtain skills to restore biological variety of hydrobioresources, enhance bio and fish productivity of natural waters. It is possible only on the scientific basis of rational use of resource base of hydrobionts, its effective resource saving harvesting which is grounded on scientific and legal awareness about bioresources, predicting and managing fish productivity of waters.

### **Areas of employment of graduates**

On completing this master's degree program, specialists can apply for employment at State Department of Fisheries of Ukraine, Department of Aquatic Biological Resources Protection, Reproduction and Regulation of Fisheries, territorial (oblast and district) fishery protection bodies, the territorial agencies of Ministry of Environmental Protection of Ukraine, Research Institute of Fisheries of NAAS of Ukraine, Institute of Hydrobiology of NAS of Ukraine and other scientific and research enterprises, at public and private fishery farms in harvesting commercial hydro bioresources of waters.

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***Optional Block "Bioproductivity of continental reservoirs"***

The main task of this Master's program is to train specialists who will be able to estimate the productivity of waters. Students will study the ability of water eco systems to form an amount of biological products such as the biomass of aquatic plants, invertebrates, fish and other aquatic organisms.

**Areas of employment of graduates**

Graduate can work in the system of State Agency for Fishery of Ukraine, Department of Protection, reproduction and use of water bio resources and fishing regulation; territorial fishery bodies (regional and district); Institute of fishery of NAAS of Ukraine; Institute of hydro biology of NAS of Ukraine and other scientific and research organizations; at state and private fisheries.

***Optional Block "Ornamental aquatic bioresources"***

The main task of the master's program is to train specialists in aquaristics and terrariums, able to work at zoos, aquariums, research institutions, other public and private enterprises engaged in the manufacturing and maintaining of ornamental aquatic systems, breeding and distributing both freshwater and marine aquatic organisms.

**Areas of employment of graduates**

After graduation, specialists can work at private and public zoos, aquariums, pet stores; private companies engaged in the manufacture and maintenance of ornamental aquatic systems, breeding of both freshwater and marine aquatic organisms, and their distribution.

***Optional Block "Ichthyofauna of reservoirs and breeding of ornamental aquatic organisms"***

The main objective of the master's degree program is to train ichthyology professionals who can work in the State Department of Fisheries of Ukraine, State Fishery Inspection, its oblast and district structures, research institutions and other public and private enterprises dealing with cultivation and fishing in the fish farms, particularly in mixed-use ponds.

**Areas of employment of graduates**

After having successfully completed the master's degree program the specialists can apply for employment in Ichthyological Service of the State Department of Fisheries of Ukraine, Water Bioresources Unit of the State Department of Fisheries of Ukraine, State Institution "Ukrryba"; ichthyological services of Aquatic Biological Resources Protection, Reproduction and Regulation of Fisheries oblast offices and as private entrepreneurs in specialized fish farms at mixed-use ponds.

***Optional Block "Aquaculture and fishery use of inland waters"***

The task of the program is to train researchers in aquaculture ponds for industrial fish farms of various types, research institutes specializing in reproduction and cultivation of traditional and non-traditional aquaculture facilities, research fish diseases, nutrition, genetic-molecular research.

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### **Areas of employment of graduates**

After finishing university specialists can work in state fish farms and private farms in Ukraine; State Fisheries Agency of Ukraine; State Enterprise "Ukrryba"; Research Institute of Fisheries.

### ***Optional Block "Reproduction and conservation of aquatic bioresources"***

The task of the program is to train researchers in aquaculture ponds for fish farms of different types, research institutes specializing in reproduction and cultivation of traditional and non-traditional aquaculture facilities, research fish diseases, nutrition, genetic-molecular research.

### **Areas of employment of graduates**

After finishing university specialists can work in state fish farms and private farms in Ukraine; State Fisheries Agency of Ukraine; State Enterprise "Ukrryba"; Research Institute of Fisheries.

### ***Optional Block "Sturgeon Breeding"***

The objective of the Master's degree program is to train sturgeon breeding specialists who will work at sturgeon fisheries, in specialized sturgeon fish farms of different types, and in research institutions focusing on preservation of sturgeon populations and breeding of its industrial stocks in natural waters and promote development of commercial sturgeon breeding; the graduate students will also be employed in agencies of the State Department of Fisheries of Ukraine and address issues related to restoration and monitoring the use of natural resources and ensuring further development of sturgeon commercial aquaculture.

### **Areas of employment of graduates**

After having successfully completed the master's degree program, the specialists can apply for employment with the State Department of Fisheries of Ukraine, Ukrainian sturgeon factories and private farms, Department of Aquatic Biological Resources Protection, Reproduction and Regulation of Fisheries in Kyiv Oblast, and the Research Institute of Fisheries, NAAS of Ukraine.

### ***Optional Block "Salmon Breeding"***

The objective of the Master's degree program is to train salmon breeding specialists who will work at salmon fisheries, in specialized salmon fish farms of different types, and in research institutions focusing on preservation of salmon populations and breeding of its stocks in natural waters and promote development of commercial salmon breeding; the graduate students will also be employed in agencies of the State Department of Fisheries of Ukraine and address issues related to restoration and monitoring the use of natural resources and ensuring further development of salmon commercial aquaculture.

### **Areas of employment of graduates**

After having successfully completed the master's degree program, the specialists can apply for employment with the State Department of Fisheries of Ukraine, Ukrainian sturgeon factories and private farms, Department of Aquatic Biological Resources Protection, Reproduction and Regulation of Fisheries in Kyiv Oblast, and the Research Institute of Fisheries, NAAS of Ukraine.

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### Practical training

Practical training of Fisheries Department students is a component of the curriculum the students require to obtain necessary qualification, professional skills and abilities. This training is performed at the forefront of modern fishery enterprises under organizational and methodological guidance of Department of Aquaculture's faculty and specialists of the enterprises.

While studying at the University, the students receive a thorough theoretical and practical training in modern laboratories equipped with new equipment, in computer classes as well as at leading fishery enterprises such as PJSC "Kyyivrybhosp", SE "Irkliiv Fishpond", SE "Ukrriyba", DG "Great Lubin", PJSC "Hmelnytskrybhosp", PE "Aquarium Technologies", PJSC "Sumyrybhosp", PJSC "Hersonrybhosp", JSC "Vilshanka", ARC "Kherson Fishermen", PJSC "Poltavarybhosp", Fishing Farm "Nyvka", IRG NAAS of Ukraine, JSC "Chernihivrybhosp", the Louis Pasteur National Lyceum (France) and others.

### Proposed Topics of Master's qualification Thesis

1. Fish-breeding and biological rationale for the project of full-scale Lena Sturgeon (*Acipenser baeri* Brandt) pond fishery.
2. Features and methodological approaches to breeding domesticated stock of Russian Sturgeon (*Acipenser guldenstadty* Brandt) in sturgeon fisheries.
3. Aqua -design of South America aquasystem decorative freshwater habitat.
4. Innovations in Cichlid fish (*Cichlidae*) keeping and breeding technologies.
5. Methods to improve bioproductivity potential of industrial fishing farms.
6. Forecasting biological productivity of fishery ponds based on the aquatic environment's abiotic factors.
7. Methodological approaches applied to selection and breeding of rainbow trout (*Oncorhynchus mykiss*) in breeding farms.
8. Effective use of synthetic germ cell ovulation stimulants in artificial reproduction of the white carps (*Hypophthalmichthys molitrix*).
9. Current status of fish fauna in mixed-use fishery ponds and ways to improve their fish productivity.
10. Structural and functional characterization of plankton, benthic organisms, and macrophytes in changing aquatic environment conditions.

### Curriculum of Master training in educational program "Water Bioresources and Aquaculture" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Information technologies in fish farming	4	exam
CC 2	Communication in the fish farming collectives	4	exam
CC 3	Economics of fisheries sector	4	exam
CC 4	Pedagogics	4	exam
CC 5	Methodology and organization of scientific research on the basics of intellectual property	5	exam
<b>Total</b>		<b>21</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test



**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6	Environmental physiology and biochemistry of aquatic organisms	5	exam
CC 7	Intensive aquaculture technologies	4	exam
CC 8	Theoretical foundations of fish farming	4	exam
CC 9	Theory of fish population dynamics	4	exam
CC 10	Production management in fishery	4	exam
CC 11	Production Practice	10	exam
CC 12	Certification exam	1	exam
CC 13	Preparation and defense of qualification master's thesis	9	
<b>Total</b>		<b>41</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to speciality</b>			
<i>Optional Block 1 «The fauna of the wetlands»</i>			
OC 1.1	Biology of productivity objects wetland fauna	5	exam
OC 1.2	Trofology and animal reproduction	5	exam
OC 1.3	Biomonitoring and protection of wetland fauna	5	exam
OC 1.4	Resource management of wetland fauna	5	exam
<i>Optional Block 2 «Protection and productivity of hydrobioresources»</i>			
OC 2.1	Assessment of the ecological state of water bodies	5	exam
OC 2.2	The bioproductivity of waters	5	exam
OC 2.3	Protection of aquatic organisms	5	exam
OC 2.4	Management of of aquatic organisms	5	exam
<i>Optional Block 3 «Harvested hydrobiological resources»</i>			
OC 3.1	Industrial ichthyology	5	exam
OC 3.2	International regulation of fishing	5	exam
OC 3.3	Managing fish productivity of reservoirs	5	exam
OC 3.4	Forecasting of productivity of reservoirs	5	exam
<i>Optional Block 4 «Bioproductivity of of continental waters»</i>			
OC 4.1	Hydrobiofacies	5	exam
OC 4.2	The bioproductivity of waters	5	exam
OC 4.3	The methodology of evaluation of water bioproductivity	5	exam
OC 4.4	Management of water productivity	5	exam
<i>Optional Block 5 «Ornamental aquatic bioresources»</i>			
OC 5.1	World ornamental aquatic bioresources	5	exam
OC 5.2	Cultivation technology of ornamental aquatic bioresources	5	exam
OC 5.3	Health of ornamental aquatic organisms	5	exam
OC 5.4	Aquatic design and ornamental aquatic systems construction	5	exam
<i>Optional Block 6 «Ichthyofauna of reservoirs and breeding of ornamental aquatic organisms»</i>			
OC 6.1	Ichthyocenology	5	exam
OC 6.2	Aquatic design and ornamental aquatic systems construction	5	exam
OC 6.3	Ichthyofauna of Ukrainian ponds	5	exam
OC 6.4	Cultivation technology of ornamental aquatic bioresources	5	exam
<i>Optional Block 7 «Aquaculture and fishery use of inland waters»</i>			
OC 7.1	Technologies for cultivating additional aquaculture facilities	5	exam
OC 7.2	Technologies of pond aquaculture	5	exam
OC 7.3	Technologies of commercial aquaculture	5	exam
OC 7.4	Technical equipment of industrial aquaculture	5	exam
<i>Optional Block 8 «Reproduction and conservation of aquatic bioresources»</i>			
OC 8.1	Productivity biology of pond aquaculture facilities	5	exam
OC 8.2	Technologies of reproduction of aquatic organisms	5	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 8.3	The selection of objects for commercial aquaculture	5	exam
OC 8.4	Reproduction of natural fish populations	5	exam
<i>Optional Block 9 «Sturgeon breeding»</i>			
OC 9.1	Biological productivity of sturgeon species	5	exam
OC 9.2	Selection of sturgeon breeding objects	5	exam
OC 9.3	Sturgeon husbandry in ponds	5	exam
OC 9.4	Industrial sturgeon	5	exam
<i>Optional Block 10 «Salmon breeding»</i>			
OC 10.1	Biological productivity of salmon species	5	exam
OC 10.2	Selection of salmon breeding objects	5	exam
OC 10.3	Salmon husbandry in ponds	5	exam
OC 10.4	Industrial salmon	5	exam
<b>Total</b>		<b>20</b>	
<b>The total amount of compulsory components</b>		<b>62</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OFF EPP</b>			<b>90</b>

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Information technologies in fish farming.** Students learn the behavior and work of a specialist using standard reference and specialized literature, laws of Ukraine, government acts, and results of psychoanalytic researches, calculation techniques and information technologies. Students learn to organize production processes in fishery taking into account personal peculiarities of a specialist, to reveal leader features and professional competence in managing fishery teams, to conduct business communication to prevent and regulate industrial conflicts at fisheries, to processes of fish farming with taking into account individual peculiarities of personality; to demonstrate leadership qualities and professional competence in managing fishery teams; to organize business communication to prevent and regulate industrial conflicts at fisheries, to manage personnel policies, to promote the image and professional ethics of specialists and fisheries.

**Communication in the fish farming collectives.** Students study the current state and problems of work safety in fishery. Students learn organizational demands of interbranch and branch standard and legal acts in work safety in order to implement them at fisheries which belong to the system of managing work safety; establishment and functioning work safety service at enterprises; means of keeping standards of productive environment and work safety while doing technological processes in fishery in order to approve management solutions which will prevent accidents, injuries, occupational diseases at the enterprises. Students also learn organization and population protection in emergency situations of economical, natural and ecological nature; prevention of appearance of emergency situations, measures to reduce loss; warning about the threat of disasters; life support during accidents, major fires, accidents, natural disasters and in armed conflicts, conducting rescue operations, forecasting, monitoring and control of radioactive contamination, chemical contamination, ensuring the sustainability of agriculture facilities in emergencies.

**Economics of fisheries sector.** Students learn the profile of future administrator and specialist who knows the state of fishery of Ukraine within economic globalization, learns how to provide food security using fishery potential, development of national bodies

of state regulation of fishery, regulatory policy in fishery, rent price for a water body and rent payment for the land under this body, conducting land auctions.

**Pedagogics.** Generates future specialists professional (general pedagogical) knowledge and skills that are in knowledge about the nature of learning, education and training, the main directions and principles, methods and forms of education and training, the principles of forming the content of education and training; approaches to evaluating the success of the training, skills characterize the organization of educational and training process.

**Methodology and organization of research with the principles of intellectual property.** The aim of the discipline is formation of the system of knowledge in methodology, theory of method and research process, methodical support of scientific and research activity at the stages of preparation of a Master paper, formation of the ability to organize research of a specific issue using the whole complex of the traditional methods of research including general and special methods. The main task of the theoretical part of the course is introduction to students the current concepts of research creation, the principles of methodology of scientific perception and methods of research. The main task of the practical part is the development of self-education ability, mastering skills of formation and application of perceived methodological position of research. In case of mastering the course students have to improve their skills of search, assortment and processing of scientific information, accurate formulation of a problem, aim, task, object, subject, methods of research. Introduction to students the principles of intellectual property and direction of them to gain knowledge and skills concerning registration of rights of ownership, their protection, commercialization, estimation and management are envisaged.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Fisheries research methods.** The discipline combines general methods and techniques of hydrological, hydrochemical, hydrobiological, ichthyological and fisheries research aimed at enhancing sustainable use of natural and artificial hydrobiocenoses.

**Environmental physiology and biochemistry of aquatic organisms.** This discipline studies physiological and biochemical processes occurring in the body of aquatic animals at different stages of embryonic and postembryonic development and during their growth in ontogenesis under normal conditions and under the influence of natural aquatic environment factors (temperature, gas treatment, water salinity, etc.). The curriculum of this discipline provides also for studying age-related characteristics and seasonal peculiarities of metabolism in fish at different periods of their annual cycle, as well as physiological and biochemical mechanisms of fish adaptation to natural factors.

**Intensive aquaculture technologies.** This discipline completes the cycle of special courses and focuses on the most recent world and national achievements and scientific research in the field of freshwater and marine aquaculture. Future professionals studying this discipline must get acquainted with the latest global and domestic research and foster their creativity in future careers. Studying this discipline is aimed at developing science-based solutions of process control in fish production, learning measures to increase efficiency of technological processes, develop production plans and evaluate their effectiveness through modeling techniques. Knowledge of methodological approaches to development of mathematical models improve qualification of fishery engineers, help them develop a scientific understanding of technology and enable with new opportunities of improving it in their future careers. This discipline provides for a clear understanding of modern methods used in fisheries management, the current state of fish production in the world and in Ukraine, the ability to assess the prospects of the fishing industry in the

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current environment with regard to trends in global fish market, available resources, increasing fishery production and aquaculture.

**Theoretical foundations of fish farming.** This discipline focuses on basics of breeding theory, evidence-based methods and techniques underpinning the modern farming and reproduction of fish stocks under specific environmental conditions in order to improve existing technologies applied in artificial reproduction of rare and endangered species; develop science-based methods enhancing vitality of fish stocking material at different stages of ontogenesis; grow high-quality commercial fish farming products; create optimal conditions for breeders in factory conditions; develop new sustainable resource-breeding technologies.

**Theory of fish population dynamics.** The discipline offers an introduction into the science of sustainable fisheries management and quasi-natural reservoirs relying on the consistent patterns of dynamics in fish populations, estimation of the extent of their stocks and correlation between changes of this value and fishing intensity. The value of fish stocks and their composition undergo annual and long-period fluctuations that can be forecasted and planned by combination of such processes as replenishing industrial fish herds, nutrition, fertility, growth and maturation, mortality from fishing and natural reasons.

**Production management in fishery.** This course will provide with theoretical knowledge and practical skills of production management that is how to develop an enterprise strategy, to analyze projects and methods of evaluation of their effectiveness, how to manage capital investment using the most effective tools of activities to get profit as well as to increase social effect, the value of assets and own capital.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### ***Optional Block 1 "The fauna of the wetlands"***

**Biology of wetland fauna productivity.** Students study biological potential of wetland fauna for a certain period of time and in certain environmental conditions: marshlandscienega, moss land, bog either artificial or natural, permanent or temporary, static or flowing, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters including areas in which coastal river and sea zones adjacent to the wetlands, and islands can be located. Students learn the possibility of wetland fauna to form medium or maximum biomass, conditions of optimal state of wetland ecosystems in which productivity stability or its growth is achieved.

**Trophoecology and creation of wetland fauna.** Discipline that uses chains lives and creates animals in wetlands. A significant diversity of the biological half-year is used by the same diverse ecological environment for the life and reproduction of animals. The study of living chains allows us to suggest the state of the wetland ecosystem, what are its links and the state of the ecosources needed for significant problems and the growth of wetland animals.

**Biomonitoring and protection of water and wetland fauna.** Students learn a structural and functional organization of water and wetland eco systems, processes of their natural and anthropogenic dynamics. Ecological researches and monitoring environmental objects which are a part of multi aspect ecological activity which is done in the country ensure the formation and effective functioning of the system of biological monitoring of water and wetland eco systems. The program aims at identifying and predicting the state of water and wetland ecosystems taking into account landscape and climate conditions, tyoes of water and wetland ecosystems and anthropogenic changes of the environment ( climate changes and pollution of the environemt)

**Management of water and wetland fauna resources.** Students learn animal resources of water and wetland, its rational use, reproduction and protection on the basis

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of International and All-Ukrainian standards. As water and wetland are presented by various natural and artificial biotopes where animal world live there is need in revising kinds of animal world and their importance as ecological resource for human needs.

*Optional Block 2 "Protection and productivity of hydrobioresources"*

**Assessment of the ecological state of water bodies.** Students learn a system of monitoring water quality and environmental condition of continental reservoirs according to European Water Framework Directive; current standardized indicators of water quality of continental fishery ponds as well as evaluation of ecological state of continental water bodies of different types by integrated indicators for indicator organisms such as natural (rivers, lakes, reservoirs) and artificial (ponds) hydroekosystems.

**The bioproductivity of waters.** Students will learn about biological process in water plankton benthos, methods of revealing primary plankton product and organic substances destruction in waters, ways of calculating aqua products, general laws of population growth and the increase. Students will also learn about the balance of organic substances and energy and aqua animals participation in the process of transformation in water eco systems. They will study the formation and transformation of substances and energy by means of autotrophic and heterotrophic aquatic component eco systems, factors that limit and stimulate production and destruction processes.

**Protection of aquatic organisms.** This discipline examines the scientific basis underlying development and implementation of substantiated hydrosphere protection measures where hydrosphere is regarded as an environment inhabited by aquatic organisms, biological balance of aquatic ecosystems is restored, aquatic biodiversity is maintained, sustainable use of water resources is provided and human impact on water bodies of different types is reduced.

**Management of of aquatic organisms.** Is examines the management and structure of fisheries legislation specific activity of the state, which has executive i administrative nature, is organizing influence on relations through the use of state-power. Study courses aimed at mastering the instructions for use of fish and other aquatic resources with creative use of each new transaction corresponding current regulatory and technological base, in order to apply this knowledge in professional activity of future specialists.

*Optional Block 3 "Harvested hydrobiological resources"*

**Industrial ichthyology.** Students learn scientific information about the variety of commercial fish which are in continental waters of the world and Ukraine in particular. Students learn about systematic groups of commercial fish and peculiarities of structural features of their representative as well as learn how to identify fish species belonging in the waters of the world and Ukraine in particular, to be skilful in identifying, characterise commercially valuable species of ichthyfauna their structure, biology, commercial value, perspective of possible commercial and other use.

**International regulation of fishing.** It considers the issue of sharing biological resources of international water bodies, defining the role of Ukraine as a sovereign state, to regulate these processes on the basis of priorities of domestic and foreign policy of Ukraine in the field of protection, use and reproduction of aquatic resources taking into account the state course toward integration into the European Union , and in particular the harmonization of national legislation with EU directives and international environmental standards.

**Managing fish productivity of reservoirs.** Students learn how to use ichthyfauna variety of natural and natural and technical (reservoirs) continental waters of Ukraine on the basis of a clear strategy and tactics of management of domesic reservoirs of various

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purposes, normalization of relations between water users identifying major ones, who would be responsible for the state of fish diversity in each reservoir. Students also learn how to provide regional control system of continental water fish productivity through changes in legislation and regulations in fishery, inventory, developing a net of water-reserves, the development and implementation of government recovery programs listed in Red fish Book of Ukraine as well as learn how develop ways to increase fish productivity and improve the fish fauna of continental waters.

**Forecasting of productivity of reservoirs.** Students learn patterns of transformation of energy and matter cycle in aquatic ecosystems, learn how to identify aquatic organisms productivity, develop methods for predicting productivity of reservoirs and measures for their improvement. Students also study theoretical foundations of aquaculture and practical implementation of recommendations aimed at its rational use, learn main factors of reducing biotechnical methods of productivity enhancement of continental waters as well as methods of forecasting of continental waters productivity and learn how develop methods of forecasting the state of fish fauna and fish productivity of continental waters.

*Optional Block 4 "Bioproductivity of continental waters"*

**Hydrobiofacies.** Students will learn about the structure of hydrobiofacies, their components, factors which influence on the quality of water eco systems, interconnection between structural components of hydrobiofacies, their functioning and behavior, the dynamics and development of hydrobiofacies. They will be able to develop rational and effective system of management of quality of water environment and water productivity.

**The bioproductivity of waters.** Students will learn about biological process in water plankton benthos, methods of revealing primary plankton product and organic substances destruction in waters, ways of calculating aqua products, general laws of population growth and the increase. Students will also learn about the balance of organic substances and energy and aqua animals participation in the process of transformation in water eco systems. They will study the formation and transformation of substances and energy by means of autotrophic and heterotrophic aquatic component eco systems, factors that limit and stimulate production and destruction processes.

**The methodology of evaluation of water bioproductivity.** Students will learn how to plan, organize and conduct hydro biological researches, principles of systematization, summarizing and interpretation of the received results about the state of hydro biological waters.

**Management of water productivity.** Students will learn about the management of processes of products of organic substances in natural and artificial waters. It is the final stage of training ichthyologists, pisciculturists and hydrobiologists. Students will learn about processes of formation of quality water, its influence on bio production and bio productivity of waters of complex and commercial fishing.

*Optional Block 5 "Ornamental aquatic bioresources"*

**World ornamental aquatic bioresources.** Studies classic and new types of ornamental aquatic organisms that appear due to the downgrade of natural conditions under influence of anthropogenic factors in artificial aquatic systems and natural living conditions, namely water as a habitat for biological objects. Application areas are research in biology and ecology of animals and plants, their reproduction, nutrition, and behavior in artificial and natural aquatic systems (aquatic biocenoses).

**Cultivation technology of ornamental aquatic bioresources.** Studies modern technologies of cultivation (breeding, growing, and keeping) of ornamental marine and freshwater fish, clams, crustaceans, and other aquatic organisms and cultivation of food

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for their vital activity; based on modern scientific achievements and research in the field of ornamental aquatic organisms cultivation.

**Health of ornamental aquatic organisms.** Studies the existence conditions of aquatic organisms that cause several diseases affected by inappropriate living conditions, nutrition or injuries during reproduction, etc. ; and various types of lesions by parasitic organisms; therefore, during the course, it is mandatory to study the most common diseases, methods of their diagnosis and treatment at different stages of the lesion; proper transportation and acclimatization of species that belong to different taxonomic groups.

**Aquatic design and ornamental aquatic systems construction.** Studies the basic methods and ideas concerning the planning and design of artificial ornamental aquatic systems (ornamental marine and freshwater aquariums, ponds, paraterariums, paludariums, etc.), based on different directions and requirements for the living conditions of different aquatic organisms; for the reason that aquatic systems need permanent ecological balance maintenance and compatibility between living organisms.

*Optional Block 6 "Ichthyofauna of reservoirs and breeding  
of ornamental aquatic organisms"*

**Cultivation technology of ornamental aquatic bioresources.** Studies modern technologies of cultivation (breeding, growing, and keeping) of ornamental marine and freshwater fish, clams, crustaceans, and other aquatic organisms and cultivation of food for their vital activity; based on modern scientific achievements and research in the field of ornamental aquatic organisms cultivation.

**Aquatic design and ornamental aquatic systems construction.** Studies the basic methods and ideas concerning the planning and design of artificial ornamental aquatic systems (ornamental marine and freshwater aquariums, ponds, paraterariums, paludariums, etc.), based on different directions and requirements for the living conditions of different aquatic organisms; for the reason that aquatic systems need permanent ecological balance maintenance and compatibility between living organisms.

**Ichthyofauna of Ukrainian ponds.** This discipline is part of professional and practical training of master's degree students with major in "Water Bioresources"; upon completion of this course, the students will master modern data on fish biodiversity of Ukraine's inland waters, Azov and Black Seas, and the current classification system for ichthyofauna and fish, their biological characteristics; fundamentals and principles of Ukrainian ichthyofauna's systematics.

**Ichthyocenology.** This discipline provides knowledge about fish grouping habits and patterns of such grouping in water reservoirs of different types, dependence of fish communities (ichthyocenosis) on environmental factors. Particular attention is given to groups dominated by commercial fish species and some rare and endangered species of Ukrainian fauna.

*Optional Block 7 "Aquaculture and fishery use of inland waters"*

**Technologies for cultivating additional aquaculture facilities.** The discipline studies the peculiarities of the biology of non-traditional objects of pond fish farming; technologies of reproduction of non-traditional objects; cultivation of non-traditional objects in mono- and polyculture in the conditions of fish ponds; foreign experience of growing non-traditional aquaculture facilities in ponds.

**Technologies of pond aquaculture.** Discipline that studies the basics of traditional technology of reproduction and cultivation of aquaculture; innovative technologies in pond fish farming; the latest methods of fish breeding in the European Union, the United States, Canada, China, etc. ; economics and technologies of commercial fish farming; integrated technologies in fish farming.

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**Technologies of commercial aquaculture.** Students will learn about technologies of reproduction and growing aquaculture objects; innovative technologies in commercial fishing; new methods of breeding and cultivating fish in European Union, the USA, Canada, China, etc.; integrated technologies in fisheries.

**Technical equipment of industrial aquaculture.** Forms students' theoretical base and practical skills skilled use of technological aquaculture complexes and farms, provides study of the general characteristics of types of equipment for fish farming, technological mode of equipment, ability to calculate the necessary equipment to perform specific production tasks.

*Optional Block 8 "Reproduction and conservation of aquatic bioresources"*

**Productivity biology of pond aquaculture facilities.** Students will learn about ecological and biological peculiarities of main objects of pond aquaculture; factors influencing their productivity, the analysis of keeping conditions, peculiarities of fish feeding in terms of different commercial growing, methods how to increase the productivity. They will also learn about biological peculiarities of fish to increase their productivity, the analysis of hydrological, chemical and thermal regimes of waters, their correction, technological and financial abilities of fisheries.

**The selection of objects for commercial aquaculture.** Students will learn about fish productive properties when grown for pond fisheries; modern methods of fish selection in order to form and consolidation economically and hereditary useful properties of aquaculture grown in nurseries, pools and recirculation installations. They will also learn about the use of genetic methods of fish selection to detect breeding material to accelerate the formation and consolidation of aquaculture objects; organization and conducting selection and breeding activities at enterprises of different types and forms of ownership; the methodology of researches in the domain of fish selection.

**Technologies of reproduction of aquatic organisms.** Discipline based on the study of the current state of reproduction of aquatic organisms, breeding and breeding in fish farming, characteristics of the gene pool of fish, study of basic methods of breeding and cultivation of aquatic organisms and formation of breeding herds, practical acquaintance with basic processes and methods of reproduction of aquatic organisms.

**Reproduction of natural fish populations.** Discipline that studies the volume, structure and location of natural fish populations, patterns of their formation, possibilities and scales of use and reproduction, as well as considers the directions of their use.

*Optional Block 9 "Sturgeon breeding"*

**Biological productivity of sturgeon species.** This discipline studies biological and economic features of sturgeon, the current state of sturgeon stocks in the world, population structure and life cycle of most valuable species, the impact produced by natural and anthropogenic factors on performance and techniques of sturgeon artificial reproduction in order to increase the abundance of this species.

**Selection of sturgeon breeding objects.** This is the discipline that studies theory and practice of selection and breeding in sturgeon farming. The students will obtain knowledge about sturgeon's biological characteristics and commercial traits in order to develop theoretical and practical foundations for development and operation of domesticated reproduction sturgeon stock, identifying areas of sturgeon selection and breeding work.

**Sturgeon husbandry in ponds.** This is the discipline that completes the cycle of special courses and provides students with knowledge about the most recent world and national research in the field of sturgeon husbandry in ponds, examines organizational structure of sturgeon fish farms, their arrangement, biological basis of comprehensive

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measures to intensify pond sturgeon aquaculture, enhance biological and fish productivity of ponds, technologies for fostering spawn in sturgeon breeding farms, technologies of building the reproduction sturgeon stock and stock of commodity pond sturgeon in warm-water aquaculture, taking into account systems, forms and cycles of fisheries management.

**Industrial sturgeon.** Students study a theoretical basis and obtain practical skills for planning and management processes of cultured sturgeon in gardens, pools and recirculation fish farming systems and analyze the results of this work. Students obtain advanced knowledge about technological processes in the industrial sturgeon farming, modern technologies of artificial reproduction, intensive sturgeon production in gardens, pools with recycled water supply. Students also learn to use modern regulatory and technological base while planning production processes and analyzing the results of aquaculture; learn how to use environmentally friendly approach in planning and carrying out work on industrial methods of sturgeon aquaculture.

#### *Optional Block 10 "Salmon breeding"*

**Biological productivity of salmon species.** This discipline studies biological and economic features of salmon, the current state of salmon stocks in the world, population structure and life cycle of most valuable species, the impact produced by natural and anthropogenic factors on performance and techniques of salmon artificial reproduction in order to increase the abundance of this species.

**Selection of salmon breeding objects.** This is the discipline that studies theory and practice of selection and breeding in salmon farming. The students will obtain knowledge about salmon's biological characteristics and commercial traits in order to develop theoretical and practical foundations for development and operation of domesticated reproduction salmon stock, identifying areas of salmon selection and breeding work.

**Salmon husbandry in ponds.** This is the discipline that completes the cycle of special courses and provides students with knowledge about the most recent world and national research in the field of salmon husbandry in ponds, examines organizational structure of salmon fish farms, their arrangement, biological basis of comprehensive measures to intensify pond salmon aquaculture, enhance biological and fish productivity of ponds, technologies for fostering spawn in salmon breeding farms, technologies of building the reproduction salmon stock and stock of commodity pond salmon in cold-water aquaculture, taking into account systems, forms and cycles of fisheries management.

**Industrial salmon.** Students study a theoretical basis and obtain practical skills for planning and management processes of cultured salmon in gardens, pools and recirculation fish farming systems and analyze the results of this work. Students obtain advanced knowledge about technological processes in the industrial salmon farming, modern technologies of artificial reproduction, intensive salmon production in gardens, pools with recycled water supply. Students also learn to use modern regulatory and technological base while planning production processes and analyzing the results of aquaculture; learn how to use environmentally friendly approach in planning and carrying out work on industrial methods of salmon aquaculture.

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## **FACULTY OF VETERINARY MEDICINE**

**Dean** – Doctor in Biology, Professor, Academician of NAAS of Ukraine Mykola Tsvilikhovskyy

Tel.: (044) 527-82-31

E-mail: m\_tsvilikhovsky@nubip.edu.ua

Location: Building № 12, room № 324, «G»

Faculty organizes and controls educational process of preparation for the Masters educational program to the specialties:

### **Specialty 211 "Veterinary medicine"**

#### ***Educational-professional program "Veterinary medicine"***

Guarantor of the program – Kostyuk Vladimir Kondrativich, Doctor of Veterinary Sciences, Professor of the department Anatomy, histology and pathomorphology animal named after acad. V.G.Kasyanenko

#### ***Educational-professional program "Veterinary medicine" (6 years)***

Guarantor of the program – Nataliia Grushanska, Head of Department - Doctor of Veterinary Science, Associate Professor

Graduating departments:

**Anatomy, histology and pathomorphology animal named after acad. V.G.Kasyanenko**

Tel.: (044) 527-86-17

E-mail: museum@nubip.edu.ua

Head of Department – Doctor of Veterinary Sciences, Professor Oleg Melnyk

#### **Obstetrics Gynaecology and Animal Reproduction Biotechnology**

Tel.: (044) 527-83-46

E-mail: akusherstvo@nubip.edu.ua

Head of Department – Candidate of Veterinary Science, Associate Professor Oleksandr Valchuk

#### **Epizootiology, microbiology and virology**

Tel.: (044) 527-80-10

E-mail: epizootology@nubip.edu.ua

Head of Department – Candidate of Veterinary Sciences, Associate Professor Volodymyr Melnyk.

#### **Pharmacology, parasitology and tropical veterinary**

Tel.: (044) 527-83-65

E-mail: parma@nubip.edu.ua

Head of Department – Candidate of Veterinary Sciences, Associate Professor Vadym Ishchenko

#### **Therapy and clinical diagnosis**

Tel.: (044) 527-87-92

E-mail: grushanska\_ng@nubip.edu.ua

Head of Department – Doctor of Veterinary Science, Associate Professor Nataliia Grushanska

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**Surgery and pathophysiology named prof. I.O Povazhenka**

Tel.: (044) 527-88-68

E-mail: [chirurgia@nubip.edu.ua](mailto:chirurgia@nubip.edu.ua)

Head of Department – Doctor of Veterinary Sciences, Associate Professor Mykola Malyuk

**Veterinary hygiene named prof. A.K. Skorokhodko**

Tel.: (044) 527-81-56

E-mail: [kucheruk\\_md@nubip.edu.ua](mailto:kucheruk_md@nubip.edu.ua)

Head of Department - Candidate of Veterinary Science, Associate Professor Mariia Kucheruk

**Specialty 212 "Veterinary hygiene, sanitary and expertise"**

***Educational-professional program "Veterinary hygiene, sanitary and expertise" (6 years)***

Guarantor of the program – Larysa Shevchenko, Doctor of Veterinary Sciences, Professor of the department Veterinary hygiene named prof. A.K. Skorokhodko

Graduating department:

**Veterinary hygiene named prof. A.K. Skorokhodko**

E-mail: [kucheruk\\_md@nubip.edu.ua](mailto:kucheruk_md@nubip.edu.ua)

Head of Department - Candidate of Veterinary Science, Associate Professor Mariia Kucheruk

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**Training of masters of sciences  
in branch of knowledge "VETERINARY MEDICINE"  
in specialty 211 "VETERINARY MEDICINE"  
educational-professional program "VETERINARY MEDICINE"**

Form of training:	Licensed number of persons:
– full-time	350
Duration of training	1 year and 4 months
Credits ECTS	90
Language of teaching	Ukrainian, English
Qualification	Doctor of veterinary medicine

**The concept of training**

Means training of highly qualified specialists in veterinary medicine, quality and safety of animal products in accordance to international standards. Professional herd health management, issues of quality and safety of animal products during its production, transportation, processing, storage and marketing. Elaboration and implementation in practice of innovative methods of prevention, diagnostics and treatment of animal diseases.

**Educational and professional programs of master's training**

***Optional Block "Preventive veterinary technologies  
of Animal Health Providing"***

The program includes training of professional doctors of veterinary medicine who possess knowledge required for veterinary service of owners of productive animals and poultry, horses, small animals and who is ready to analyze the epizootic situation, carry out preventive measures and diagnostic tests, to ensure the provision of medical care the animals suffering from infectious and non-infectious pathology.

**Areas of employment of graduates**

The field of employment of graduates of the program can be specified professional activities in the state veterinary medicine in rural areas (hospitals veterinary medicine, paragraphs, sections), a private veterinary practice to meet the needs of owners of productive veterinary service and small animals, farms and collective farms.

***Optional Block "Veterinary welfare of cattle, sheep and goats"***

The program provides training of professional masters in cattle, sheep and goat farming and aimed up to the formation of veterinary knowledge and skills to implementation and using of innovative technologies in nutrition, genetics, breeding, biotechnology and ruminant reproduction and ensuring of preventive technologies from noncontagious and contagious diseases of ruminants.

**Areas of employment of graduates**

Professional activity of expert due to master's program means working in manufacturing sector of employment associated with modern highly technological enterprises and dairy companies, complexes with beef, lamb and sheep, production, farms that specialized on growing of goats and the production goat farming.

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### ***Optional Block "Veterinary welfare of dogs and cats"***

The aim of program is to train a doctor of veterinary medicine who has knowledge of biology of dogs and cats, their housing, feeding and breeding, also to study the modern methods of diagnosis and prevention of contagious and non-contagious diseases , effective schemes of therapy for small animals.

#### **Areas of employment of graduates**

Field of graduate`s practice includes official dog breeding by Ministry of Internal Affairs and the State Border Service, kennels for dogs, dog clubs, shelters for small animals, veterinary clinics for small animals, private service for owners of small pets.

### ***Optional Block "Veterinary providing of pig breeding"***

The program includes training of professional doctors of veterinary medicine who have knowledge of modern technologies of production of pig welfare, veterinary ensuring of specialized high-tech pig complexes and became capable to improve processes, veterinary and sanitary, preventive and diagnostic measures aimed the economic indicators of the industry.

#### **Areas of employment of graduates**

The field practical activity which is specified in graduate programs are complex and specialized farms producing pork, breeding, reproducers fattening centers and research institutions engaged in scientific accompaniment of the industry, innovational and advisory activities in pig industry.

### ***Optional Block "Veterinary pharmacy"***

In accordance to their future master's degree in veterinary pharmacy should be ready for creative and professional pharmaceutical activities in the sphere of veterinary medicinal products, providing of their research, development, production, packing, storage, transportation, state registration, certification, standardization and quality control, sale, marketing, use and disposal of medicines which came shelf life.

#### **Areas of employment of graduates**

Professional activity of Masters in Veterinary Pharmacy can be productive (pharmacy, pharmaceutical and chemical-pharmaceutical companies, etc.).organizational and managerial, supervisory (licensing, certification, registration), the total pharmaceutical practice (city and district veterinary pharmacy, pharmacy in rural areas, veterinary pharmacies in therapeutic and diagnostic centers and clinics), information and education, research.

### ***Optional Block «Veterinary and sanitary expertise of agricultural and food products»***

Provides training of specialists, that are able to monitor measures of animal diseases prevention, assess the efficacy of the introduction of new technologies in production of food of animal origin and processing animal by-products and disposal of animal waste and their impact on animal health, quality and biological value of products, environmental ecology. Apply methods for evaluating the efficiency of implementation in practice of livestock husbandry new feed and feed additives, use techniques for products of animal origin production, quality and safety management.

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### **Areas of employment of graduates**

According to the National Classifications of Occupations and obtained knowledge and skills veterinary and sanitary doctors may be employed as: Chief veterinarian (1237.1); veterinarian hygiene and sanitation doctor (CO code - 2223.2); doctor of veterinary medicine on safety and quality of agricultural products and food (CO code - 2223.2); veterinarian of meat processing plants (CO code - 2223.2) Head (deputy) of State Service of Ukraine on Food Safety and Consumers Protection territorial bodies (city, district) (1229.3), Chief State Control Inspector (1229.1); Chief State Auditor (1229.1); Research assistant (Veterinary Medicine) (2223.1); Researcher (Veterinary Medicine) (2223.1); Head of Laboratory (1229.4) and others in Ministries and Departments of Ukraine, the Structural units of Government, national and foreign companies and representative offices, businesses that operate in the field of veterinary hygiene, sanitary and examination; institutions of public and private veterinary services engaged in state and internal control of sanitary measures objects in conditions of farms (livestock facilities) during production, processing, transportation, storage and retail of food and feed; apply risk-based approach in all stages of production, processing, transport, acceptance, storage and retail of food, feed additives, premixes, strains of microorganisms, reproductive and pathological material, pharmaceutical and biological preparations, veterinary medicine remedies, animal-care products and by-products, to prevent pollution due to sanitation facilities, compliance with health and sanitary legislation, implementation of phytosanitary measures, handling pesticides, biological and agrochemical compounds, control organisms and state control on agricultural markets, commercial networks at the state border and transport, fishing and hunting areas.

### ***Optional Block «Veterinary laboratory diagnostic»***

The aim of the program is to train of highly qualified specialists in laboratory diagnosis of infectious diseases, microbiological (bacteriological, virological) study of materials and foodstuffs, animal feed and environmental objects.

The basic task of the program is to master modern methods of detection of bacteria and viruses, the formation of future professionals in the environmental and of biological thinking, knowledge of their possible essence of phenomena caused by microorganisms (viruses) in animal organisms, raw materials, food and various environmental objects.

### **Areas of employment of graduates**

Microbiological laboratories , providing diagnostic tests in veterinary medicine (state laboratories of veterinary medicine) and general sanitary practice, providing microbiological control of animal products, industry labs (poultry farms, incubator stations, pig farms, companies producing animal feed), laboratories of food industry.

### **Practical training**

The bases of practical training of students is educational, scientific, educational scientific industrial laboratories of university basic institution (Kiev), its separated units, primarily educational and experimental farms of the University ("Velykosnitynske educational and experimental farm named after O.V. Muzychenko, "Agronomic Research Station", Teaching and Research Farm "Vorzel" Nemishaevo Agricultural College), where there are held laboratory and practical classes, educational and industrial practice of students. In addition, the faculty has bilateral agreements with private clinics for small animals, agricultural enterprises of different ownership forms, which are used as a basic for practical training.

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### Proposed Topics of Master's qualification Thesis

1. Management in dairy farming and monitoring indicators of safety and quality of milk.
2. The organization of veterinary support in pig farming using Dutch technology.
3. Development of quality management system in production of veterinary drugs.
4. Obstetric and gynecological clinical examination of mares at stud-farm.
5. Monitoring the spread of genetically modified food products in Ukraine.
6. Veterinary preventive measures in the system of preventing respiratory diseases in calves.
7. Substantiation of treatment methods for pets in case of poisonings by components of health care animal feed.
8. Anaesthetization in surgery of wild feline.
9. Forensic veterinary examination the causes of death in poultry farming of industrial type.
10. Clinical and pharmaceutical approaches to the selection of drugs in pathologies of the cardiovascular system.

### Curriculum of Master training in educational program "Veterinary medicine" (educational and professional program of Master's training)

Code n/a	Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work)	Amount of credits ECTS	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1.	Business foreign language	5	test
CC 2.	Informatics and computer engineering	4	test
CC 3.	Methodology and organization of scientific research on the basics of intellectual property	4	test
<b>Total</b>		<b>13</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1.	Optional subject 1	4	test
OCP 2.	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4.	Obstetrics, gynecology and animal reproduction biotechnology	5	exam
CC 5.	Special propaedeutics, therapy and prevention of internal animal diseases	5	exam
CC 6.	Surgical diseases with anesthesiology	5	test
CC 7.	Special epizootology	5	exam
CC 8.	Global parasitology	4	exam
CC 9.	State Veterinary and Sanitary Expertise	5	test
CC 10.	Comparative morphology, special pathomorphology and forensic veterinary medicine	5	exam
CC 11.	Production practice	10	test
CC 12.	Preparation and defense of master's qualification work	5	Protection of work
<b>Total</b>		<b>49</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Preventive veterinary technologies of Animal Health Providing"</i>			
OC 1.1.	Preventive technologies to ensure the health of productive	13	exam



**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits ECTS</b>	<b>The final control</b>
	animals		
OC 1.2.	Preventive technologies to ensure the health of horses	3	exam
OC 1.3.	Preventive technologies to ensure the health of small animals	4	exam
<b>Total</b>		<b>20</b>	
<i>Optional Block 2 "Veterinary welfare of cattle, sheep and goats»</i>			
OC 2.1.	Innovative technologies nutrition, genetics and breeding of cattle, sheep and goats	4	exam
OC 2.2.	Preventive veterinary technology non-communicable diseases of ruminants	10	exam
OC 2.3.	Preventive veterinary technology communicable diseases of ruminants	6	exam
<b>Total</b>		<b>20</b>	
<i>Optional Block 3 «Veterinary welfare of dogs and cats»</i>			
OC 3.1	Innovative technologies nutrition, genetics and dogs and cats breeding	4	exam
OC 3.2	Preventive veterinary technology non-communicable diseases of dogs and cats	10	exam
OC 3.3	Preventive veterinary technology contagious disease of dogs and cats	6	exam
<b>Total</b>		<b>20</b>	
<i>Optional Block 4 "Veterinary providing of pig breeding"</i>			
OC 4.1.	Innovative technologies nutrition, genetics and breeding pig	4	exam
OC 4.2.	Preventive veterinary technology non-communicable diseases of pigs	10	exam
OC 4.3.	Preventive Veterinary Technology contagious disease of pigs	6	exam
<b>Total</b>		<b>20</b>	
<i>Optional Block 5 "Veterinary Pharmacy"</i>			
OC 5.1.	Pharmacognosy, Pharmaceutical Chemistry and Toxicological Chemistry	6	exam
OC 5.2.	Pharmacy and pharmaceutical technology	6	test
OC 5.3.	Clinical Veterinary Pharmacology and Clinical Veterinary Pharmacy	4	exam
OC 5.4.	Preclinical and clinical studies of drugs	4	test
<b>Total</b>		<b>20</b>	
<i>Optional Block 6 "Veterinary and sanitary expertise of agricultural and food products "</i>			
OC 6.1	Food and feed hygiene	8	exam
OC 6.2	Methods of veterinary andsanitary examination	4	exam
OC 6.3	Quality management of the laboratory	3	exam
OC 6.4	Food Risk Analysis	5	exam
<b>Total</b>		<b>20</b>	
<i>Optional Block 7 "Veterinary Laboratory Diagnostics"</i>			
OC 7.1	Quality management of the laboratory	3	test
OC 7.2	Clinical laboratory diagnostics	7	exam
OC 7.3	Laboratory Diagnosis of Infective Diseases	7	exam
OC 7.4	Pathomorphological diagnosis	3	test
<b>Total</b>		<b>20</b>	
<b>The total amount of compulsory components</b>		<b>62</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

## Annotations of disciplines in the curriculum

### GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Business foreign language.** Integrated learning of language professional activity. Types of language activity: reading, listening, speaking. Formation of dialogue and monologue speech skills preparation of students for professional communication in speech and writing in a foreign language. Study how to translate special texts as a way of presentation of adequate scientific information content. Formation of knowledge, necessary skills and abilities which ensure masters communicative ability in the field of professional communication: in particular, the ability to organize and hold a scientific conference in the specialty, to participate in the conference and make a scientific report, a business meeting or negotiations with foreign colleagues, partners.

**Informatics and computer engineering.** The main goal of discipline is to master modern information computer technologies used in veterinary medicine to highlight the research results with sufficient validity and clarity.

**Methodology and organization of scientific research on the basics of intellectual property.** The course examines main stages of Ukrainian science and higher education, their current state, especially degreeal reform of higher education with a focus on masters training, as well as candidates and doctors of sciences. Methods of research (historical, biological, zootechnical, veterinary, special) used in veterinary medicine, bioethics of doctor, conduct, researcher and scientist, selection of topic and forming tasks of research, invention and patent.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components of EPP

**Obstetrics, gynecology and animal reproduction biotechnology.** Physiological basis and technology of obtaining sperm. Physiology and biochemistry of sperm. The technology of artificial insemination of females and embryos transplantation. Andrology. Physiology and pathology of pregnancy, inception and the postpartum period. Operative Obstetrics. Obstetrical and gynecological check-ups. Disease of the newborn. Diseases of udder. Gynecology. Infertility in females and males.

**Special propaedeutics, therapy and prevention of internal animal diseases.** The discipline studies the issues of special propaedeutic at organs and systems diseases of animal organism of non-contagious features. Peculiarities of the application of modern methods, treatment scheme, the latest approaches to diagnosis and preventive measures for the most spread internal diseases of animals are studied.

**Surgical diseases with anesthesiology** investigates surgical diseases of domestic animals, causes of their occurrence, pathogenesis, clinical signs, diagnostics, treatment and preventive measures. The basis of anesthesiology and typical surgical interventions in different parts of the body of animals for this surgical pathology are highlighted

**Special epizootology** studies the emergent, transboundary, factor and especially dangerous infectious diseases of animals, namely the study of the characteristics of the pathogen, pathogenesis, prevalence, post mortem findings, methods of diagnosis and differential diagnosis, treatment, economic losses, elimination and prevention measures, as well as risk analysis of disease outbreak.

Epidemiologists rely on other scientific disciplines like biology to better understand disease processes, statistics to make efficient use of the data and draw appropriate conclusions, social sciences to better understand proximate and distal causes, and engineering for exposure assessment.

**Global parasitology.** The purpose of the study of the discipline "Global

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parasitology" is to deepen the theoretical knowledge of masters on the diagnosis, treatment and prevention of global animal infection diseases, their practical skills in the laboratory, as well as the diagnosis knowledge and preparation for independent scientific and practical work.

**State Veterinary and Sanitary Expertise.** State Veterinary and Sanitary Expertise is a discipline of a special cycle for veterinarian students training. The objectives of the discipline is to provide the competencies necessary for veterinary graduate being able to control the hygiene requirements of food, in particular of animal origin at all stages of production, processing technology (meat, milk processing facilities, poultry processing plants, fish processing plants, etc.), as well as during transportation, storage and retail, while complying with applicable regulations

**Comparative morphology, special pathomorphology and forensic veterinary medicine.** Comparative morphology, special pathomorphology and forensic veterinary medicine - a discipline that consists of two parts. Comparative morphology studies the external form of the body of animals, their organs, the topography of the latter, as well as the external and internal structure of organs, their systems and apparatuses. Special pathomorphology and forensic veterinary medicine is a complex science that studies and solves the issue of veterinary-biological and criminalistic character in order to obtain objective evidence in pre-trial investigation and in the judicial process in conducting an analysis of the circumstances associated with the emergence of criminal, civil, economic, administrative and arbitration cases. These sciences are united in one discipline, because they are close to each other methodologically.

Comparative morphology, special pathomorphology and forensic veterinary medicine are intended for the preparation of doctors of veterinary medicine on the decision of the involvement of certain persons or circumstances in the facts of the death or harm to animals and the conduct of forensic veterinary examinations.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### ***Optional Block 1 "Preventive veterinary technologies of Animal Health Providing"***

**Preventive technologies to ensure the health of productive animals.** Discipline studies preventive veterinary measures for the emergence of non-contagious and contagious diseases in productive livestock and poultry farms of different ownership, planning epidemic measures, diagnosis of diseases of different etiology, clinical and laboratory studies of biological material, modern technology of growing animals and birds, monitoring the conditions of detention and animal feed and poultry.

**Preventive technologies to ensure the health of horses.** Mastering the disciplines will give the opportunity to acquire knowledge on feeding, housing, breeding, use and maintenance of horses, modern methods of reproduction, including the prevention of non-contagious obstetric and surgical pathology. Modern methods of diagnosis of infectious and parasitic diseases of horses and their means of prevention.

**Preventive technologies to ensure the health of small animals.** Discipline studies preventive veterinary measures for the emergence of non-contagious and contagious diseases in small domestic and exotic animals including their feeding and maintenance. Contemporary instrumental and laboratory methods for diagnosis of infectious and noninfectious diseases. Tools and schemes specific prevention of infectious and parasitic diseases. Providing professional assistance and medicines used for the treatment of small domestic and exotic animals.

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*Optional Block 2 "Veterinary welfare of cattle, sheep and goats»*

**Innovative technologies of nutrition, genetics and breeding of cattle, sheep and goats.** Discipline is aimed at in-depth study of the properties of feed nutrients absorption and conversion in the body of ruminants. The nutrient requirements depending on the direction and production technology, innovative technologies of feeding ruminants.

**Preventive veterinary technology non-communicable diseases of ruminants.** Discipline studies preventive veterinary measures for the emergence of diseases related with metabolic disorders, hormonal disorders, vitamin and mineral nutrition. Prevention of infertility and obstetric pathology in cows, sheep and goats, modern methods of reproduction of ruminants. Prevention of surgical pathology and modern technology in veterinary surgery.

**Preventive veterinary technologies of communicable diseases of ruminants.** Discipline is studying advanced technological schemes of diagnostic tests and prevention of infectious and parasitic diseases of ruminants. Vaccine prophylaxis of infectious diseases of ruminants, the use of serum, immunoglobulin, preparations which have interferonogens action. Prevention of helminthoses and diseases caused by protozoa.

*Optional Block 3 «Veterinary welfare of dogs and cats»*

**Innovative technologies nutrition, genetics and dogs and cats breeding.** Discipline aims to provide future professionals in-depth knowledge of innovative character of the need for nutrient feed composition feed control full feeding dogs and cats. Dog breeds, Dog breeding business and domestic breeds of cats. Application of inbreeding in the breeding of small animals, methods preserve the gene pool of dogs and cats. Veterinary Genetics.

**Preventive veterinary technology non-communicable diseases of dogs and cats.** Discipline studies preventive veterinary measures for the emergence of diseases associated with metabolic disorders, hormonal disorders, vitamin and mineral nutrition in dogs and cats. Prevention of obstetric pathology in dogs and cats, methods of hormonal regulation of the sexual cycle in dogs and cats. Traumatology, dentistry, orthopedics, microsurgery. Prevention of surgical pathology and modern technology in veterinary surgery.

**Preventive veterinary technology contagious diseases of dogs and cats.** Discipline aims to study modern methods of diagnostic tests and preventive measures for infectious and parasitic diseases of dogs and cats. In the course of study students will learn morphological features and life cycle of pathogens and their systematic position, etiology, pathogenesis and formation of immunity in dogs and cats. Prevention helminthoses, acaroses, entomoses, diseases caused by protozoa.

*Optional Block 4 "Veterinary providing of pig breeding"*

**Innovative technologies nutrition, genetics and breeding pig.** Discipline is aimed at in-depth study of the properties of feed nutrients absorption and conversion in the body of pigs. The nutrient requirements according to age-sex groups of pigs and production technology, innovative technology feeding pigs. Genetics and breeding in pigs. The theoretical basis of breeding pigs. The task of selection due to the intensification of the industry. Features karyotypes, hereditary anomalies interbreed gene polymorphism, quantitative and qualitative features. Modern genetic database in the pig and their use. Veterinary Genetics.

**Preventive veterinary technology non-communicable diseases of pigs.** Discipline studies preventive veterinary measures for the emergence of diseases associated with metabolic disorders, hormonal disorders, vitamin and mineral nutrition. Preventive measures for prevention of non-communicable diseases calves. Prevention of

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obstetric pathology in pigs, modern methods of pig reproduction. Prevention of surgical pathology and modern technology in veterinary surgery.

**Preventive Veterinary Technology contagious disease of pigs.** Discipline focused on the study of modern technological schemes diagnostic tests and preventive measures for infectious and parasitic diseases of pigs. Vaccine Infectious Diseases adult pigs and calves, the use of biological products that enhance the natural resistance of the body (serum immunoglobulins preparations possessing interferonogens action). Prevention of helminthoses and entomoses, acaroses, diseases caused by protozoa.

#### *Optional Block 5 "Veterinary Pharmacy"*

##### **Pharmacognosy, Pharmaceutical Chemistry and Toxicological Chemistry.**

Pharmacognosy provides the knowledge, skills and working knowledge of medicinal raw materials of plant origin, the composition of biologically active compounds and methods for their identification, the establishment of high quality and purity of practical use as a source of modern effective drugs for the treatment of animals in various pathologies. Pharmaceutical Chemistry occupies a leading position in the sector of pharmaceutical sciences, as trains professionals to address the twin problems: the creation of new medicines and quality control of drugs. Its main aim is to create a methodology and quality assessment of drugs based on general and specific patterns of pharmaceutical chemistry as an applied discipline to perform professional tasks of Veterinary Medicine degree. Toxicological Chemistry provides the basic knowledge, skills, skills for working in the field of chemical toxicology, forensic toxicology, hygiene research, forms the basis of knowledge of the biotransformation of xenobiotics, toxicodynamics toxicokinetics and toxic substances, mechanisms of toxic action of poisons, the differential diagnosis of poisoning animal natural and artificial methods of detoxification and specific antidote therapy.

**Pharmacy and pharmaceutical technology.** Pharmacy, a discipline that aims to deepen the theoretical knowledge, familiarity with regulatory and legislative documents regulating the development, production, sale and use of veterinary drugs, get practical skills and prepare graduates to work independently. The subject of discipline is the system of veterinary pharmaceutical drugs, particularly Licensing Terms pharmacy business, retail sales rules, regulations, governing state control and supervision over the quality veterinary preparations and substances regulations transportation and storage of veterinary drugs. Pharmaceutical technology – the science of the theoretical foundations and production processes of processing medicinal products prepared medication storage and dispensing. The objectives of the discipline is the study of the theoretical foundations and practical issues of making drugs in pharmacy and industrial production; familiarization with equipment and instrumentation used in pharmacies and pharmaceutical companies, identifying the right kind of packaging, exploring the normative documentation in the finished product.

**Clinical Veterinary Pharmacology and clinical veterinary pharmacy.** Clinical Pharmacology and Pharmacy – integrated applied science that combines pharmaceutical and clinical aspects knowledge about medicines. Its main task is to establish the theoretical foundations and methodological approaches of rational use of medicines. In studying the discipline, students will be acquainted with the basic principles of medical and veterinary ethics, basic types of documentation, mastering the basic techniques of laboratory and instrumental examination of patients, total absorption syndromology and clinical sympatology of most common internal diseases, learning general methodology and principles of selection of drugs for effective drug therapy, the study of clinical manifestations of drug side effects.

**Preclinical and clinical studies of drugs.** Purpose of nonclinical studies is to determine the toxicity and therapeutic efficacy of future drug, its effects on major body

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systems, and installation of the possible adverse effects on laboratory animals and test facilities. Implementation of Good Laboratory Practice (GLP), which guarantees the quality of the emerging drugs of high therapeutic effectiveness; GLP - a system of rules that cover the organizational process and the conditions under which non-clinical studies are planned, performed, provided their monitoring, a registration and storage provided a report on the test results. Clinical studies conducted to identify or confirm the clinical pharmacodynamic effects of the investigational drug or detect all adverse reactions to it, and to study absorption, distribution, biotransformation and excretion of the drug. Such studies should be conducted in compliance with Good Clinical Practice (GCP), which are governed by the rules of the advanced clinical trials.

*Optional Block 6 "Veterinary and sanitary expertise of agricultural and food products"*

**Food and feed hygiene.** The system of sanitary measures and hygiene conditions designed to preserve quality, ensure safety and suitability of food, risk-based approach at all stages of production, processing, transportation, accepting, storage and retail of food of animal and plant origin, feed, feed additives, premixes, strains of microorganisms, reproductive and pathological material, pharmaceutical and biological drugs, veterinary drugs, animal-care products and by-products, to prevent pollution due to objects of sanitary measures, Compliance with health legislation, implementation of phytosanitary measures, handling pesticides and agrochemicals, control of biological organisms and the system of state control of the agricultural markets, commercial networks at the state border and transport, hunting and fishing areas.

**Methods of veterinary and sanitary examination.** The discipline involves the study of the requirements of normative legal acts of Ukraine concerning support of research in the laboratories of veterinary-sanitary examination. Studies also accelerated (screening) and arbitration methods of veterinary-sanitary examination of food and feed sampling procedure.

**Quality management of the laboratory.** Discipline examines national and international standards for the organization of chemical analytical laboratories, evaluation of fitness techniques, traceability and uncertainty of the results. The knowledge gained will enable professionals already sufficiently understood in the laboratory and safely perform analytical measurement techniques.

**Food Risk Analysis.** Specificity and structure of risk analysis, the basic elements of risk management and measures of risk assessment and management, modeling risk; risk assessment and development of control (elimination) measures etc.

*Optional Block 7 "Veterinary Laboratory Diagnostics"*

**Quality management of the laboratory.** Discipline examines national and international standards for the organization of chemical analytical laboratories, evaluation of fitness techniques, traceability and uncertainty of the results. The knowledge gained will enable professionals already sufficiently understood in the laboratory and safely perform analytical measurement techniques.

**Clinical laboratory diagnostics.** The curriculum of the discipline includes: the formation of theoretical knowledge and practical skills of the master course students of the Faculty of Veterinary Medicine on the issues of various clinical and laboratory researches and a comprehensive assessment of the laboratory parameters of different biological material obtained from diseased animals, to determine the functional state of their organism and laboratory diagnosis of various diseases of systems and organs. This discipline is based on knowledge from such training courses as biochemistry with the basics of physical and colloidal chemistry, veterinary clinical biochemistry, clinical

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diagnosis, pharmacology, toxicology, feeding of animals and other special disciplines. Upon completion of the study of this discipline, the student of the master course must know and be able to retrieve different biological material from diseased animals, possess modern methods and procedures of laboratory research, give the correct interpretation of the obtained results, predict the possible development of complications and course of diseases, be able to conduct preclinical studies of veterinary medicinal products at laboratory animals in compliance with the requirements of good laboratory practice.

**Laboratory Diagnosis of Infective Diseases.** The purpose of studying the course of the discipline "Laboratory Diagnosis of Infective Diseases" is to deepen the practical skills in laboratory work, the peculiarities of sampling of samples for research, their transportation, research and further interpretation.

**Pathomorphological diagnosis.** The discipline "Pathomorphological diagnosis" consists of two modules: "Methods of research in pathology" and "Pathomorphological diagnosis of animal diseases." The first module examines the organization of the histological laboratory, histopathological technique, histochemical and immunohistochemical diagnostic methods, and also focuses on the practical skills of performing an abnormal dissection, analyzing sectional findings, selecting a pathological material, building a pathologic anatomical diagnosis and conclusion. The second module studies the diagnostic criteria and the main prognostic signs of infectious and non-communicable diseases, which are most often recorded in the practice of the doctor of veterinary medicine. In particular, the themes of the module introduce the masters with the pathological diagnosis of small animal tumors.

When studying the discipline "Pathomorphological diagnostics" students work directly with the pathological material in the sectional hall and the laboratory of pathomorphological; pass two certification work and exam.

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**Training of masters of sciences  
in branch of knowledge "Veterinary medicine"  
in specialty 211 "VETERINARY MEDICINE"  
Educational-professional program "VETERINARY MEDICINE"**

Form of training:	Licensed number of persons:
– full-time	350 (based on secondary education)
Duration of training	6 years
Credits ECTS	360
Language of teaching	Ukrainian, English
Qualification	Doctor of veterinary medicine

**The concept of training**

Means training of highly qualified specialists in veterinary medicine, quality and safety of animal products in accordance to international standards. Professional herd health management, issues of quality and safety of animal products during its production, transportation, processing, storage and marketing. Elaboration and implementation in practice of innovative methods of prevention, diagnostics and treatment of animal diseases.

**Educational-professional programs of master's training**

***Optional Block "Preventive veterinary technologies  
of Animal Health Providing"***

The program includes training of professional doctors of veterinary medicine who possess knowledge required for veterinary service of owners of productive animals and poultry, horses, small animals and who is ready to analyze the epizootic situation, carry out preventive measures and diagnostic tests, to ensure the provision of medical care the animals suffering from infectious and non-infectious pathology.

**Areas of employment of graduates**

The field of employment of graduates of the program can be specified professional activities in the state veterinary medicine in rural areas (hospitals veterinary medicine, paragraphs, sections), a private veterinary practice to meet the needs of owners of productive veterinary service and small animals, farms and collective farms.

***Optional Block "Veterinary welfare of cattle, sheep and goats"***

The program provides training of professional masters in cattle, sheep and goat farming and aimed up to the formation of veterinary knowledge and skills to implementation and using of innovative technologies in nutrition, genetics, breeding, biotechnology and ruminant reproduction and ensuring of preventive technologies from noncontagious and contagious diseases of ruminants.

**Areas of employment of graduates**

Professional activity of expert due to master's program means working in manufacturing sector of employment associated with modern highly technological enterprises and dairy companies, complexes with beef, lamb and sheep, production, farms that specialized on growing of goats and the production goat farming.

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### ***Optional Block "Veterinary welfare of dogs and cats"***

The aim of program is to train a doctor of veterinary medicine who has knowledge of biology of dogs and cats, their housing, feeding and breeding, also to study the modern methods of diagnosis and prevention of contagious and non-contagious diseases , effective schemes of therapy for small animals.

#### **Areas of employment of graduates**

Field of graduate`s practice includes official dog breeding by Ministry of Internal Affairs and the State Border Service, kennels for dogs, dog clubs, shelters for small animals, veterinary clinics for small animals, private service for owners of small pets.

### ***Optional Block «Veterinary laboratory diagnostic»***

The aim of the program is to train of highly qualified specialists in laboratory diagnosis of infectious diseases, microbiological (bacteriological, virological) study of materials and foodstuffs, animal feed and environmental objects.

The basic task of the program is to master modern methods of detection of bacteria and viruses, the formation of future professionals in the environmental and of biological thinking, knowledge of their possible essence of phenomena caused by microorganisms (viruses) in animal organisms, raw materials, food and various environmental objects.

#### **Areas of employment of graduates**

Microbiological laboratories , providing diagnostic tests in veterinary medicine (state laboratories of veterinary medicine) and general sanitary practice, providing microbiological control of animal products, industry labs (poultry farms, incubator stations, pig farms, companies producing animal feed), laboratories of food industry.

### ***Optional Block "Veterinary pharmacy"***

In accordance to their future master's degree in veterinary pharmacy should be ready for creative and professional pharmaceutical activities in the sphere of veterinary medicinal products, providing of their research, development, production, packing, storage, transportation, state registration, certification, standardization and quality control, sale, marketing, use and disposal of medicines which came shelf life.

#### **Areas of employment of graduates**

Professional activity of Masters in Veterinary Pharmacy can be productive (pharmacy, pharmaceutical and chemical-pharmaceutical companies, etc.).organizational and managerial, supervisory (licensing, certification, registration), the total pharmaceutical practice (city and district veterinary pharmacy, pharmacy in rural areas, veterinary pharmacies in therapeutic and diagnostic centers and clinics), information and education, research.

### ***Optional Block «Scientific-fundamental andapplied problems of veterinary medicine»***

The program aims to train veterinary-scientist who has the necessary knowledge for the scientific support of fundamental and applied veterinary medicine. Future expert competence includes the knowledge and skills for obtaining, cultivation, storage and usage of cells, including stem cells to restore the abnormal animal tissue, diagnostic investigation using cell cultures and tissues; applying of acquired knowledge and skills in research and development regulations.

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### Areas of employment of graduates

A further study in graduate school on fundamental and applied scientific specialties of veterinary and biological profiles, professional work in veterinary oriented research institutions, veterinary, medical and biological research laboratories, Ukrainian laboratory of quality and safety of agricultural products, genetic and breeding centers, veterinary clinics for small animals and horses that use cellular technology in therapy and transplantology.

### Practical training

The bases of practical training of students is educational, scientific, educational scientific industrial laboratories of university basic institution (Kiev), its separated units, primarily educational and experimental farms of the University ("Velykosnitynske educational and experimental farm named after O.V. Muzychenko, "Agronomic Research Station", Teaching and Research Farm "Vorzel" Nemishaevo Agricultural College), where there are held laboratory and practical classes, educational and industrial practice of students. In addition, the faculty has bilateral agreements with private clinics for small animals, agricultural enterprises of different ownership forms, which are used as a basic for practical training.

### Curriculum of Master training in educational program "Veterinary medicine" (educational and professional program of Master's training)

Code n\а	Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work)	Amount of credits ECTS	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components EPP</b>			
CC 1.	Inorganic chemistry	4	exam
CC 2.	Biophysics	4	exam
CC 3.	Latin language (terminology)	4	exam
CC 4.	Organic chemistry	4	exam
CC 5.	Genetics	4	exam
CC 6.	History of Ukrainian nationhood	4	exam
CC 7	Etnoculturology	4	test
CC 8.	Ukrainian language (for professional purposes)	4	exam
CC 9.	Philosophy	4	exam
CC 10	Foreign Language	4	exam
CC 11.	Physical Education	4	test
CC 12.	Methodology and organization of scientific research on the basics of intellectual property	4	test
<b>Total</b>		<b>48</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 13	History of veterinary medicine	4	test
CC 14	Ecology in veterinary medicine	4	test
CC 15	Animal anatomy	8	exam
CC 16	Cytology, histology, embryology	6	exam
CC 17	Basics of breeding animals	4	test
CC 18	Veterinary microbiology	5	exam
CC 19	Biochemistry of animals with basics of physical and colloid chemistry	6	exam
CC 20	Physiology of animals	6	exam
CC 21	Animal alimentation	4	test
CC 22	Veterinary immunology	4	test

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**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits ECTS</b>	<b>The final control</b>
CC 23	Veterinary virology	4	exam
CC 24	Hygiene of animals	5	exam
CC 25	Animal welfare, ethology and professional ethics	4	test
CC 26	Pathological physiology	6	exam
CC 27	Operative surgery, topographic anatomy and anesthesiology	7	exam
CC 28	Clinical diagnostic of internal diseases of animals	8	exam
CC 29.	Veterinary Pharmacology	7	exam
CC 30	Pathological anatomy and forensic veterinary	9	exam
CC 31	Parasitology and invasive disease	8	exam
CC 32	Veterinary radiobiology	4	test
CC 33	Veterinary Clinical biochemistry	5	test
CC 34	Obstetrics, gynecology and animal reproduction biotechnology	9	exam
CC 35	Veterinary toxicology	5	test
CC 36	General and special surgery	8	exam
CC 37	Food Safety and Hygiene	6	test
CC 38	Domestic animal diseases	8	exam
CC 39	Epizootology and infectious diseases	8	exam
CC 40	Organisation of veterinary business, national and international veterinary regulations	4	exam
CC 41	Animal reproduction	4	exam
CC 42	Special propaedeutics, therapy and prevention of internal diseases of animals	4	exam
CC 43	Surgical diseases of productive animals	4	exam
CC 44	Special epizootology	4	exam
CC 45	Global parasitology	4	test
CC 46	State veterinary and sanitary examination	4	test
CC 47	Comparative morphology, special pathomorphology and forensic veterinary medicine	4	test
CC 48	Production Practice	40	test
<b>Total</b>		<b>222</b>	
<b>Optional components EPP</b>			
<b><i>Free choice according to specialty</i></b>			
OC 1	Politology	4	test
OC 2	Conflictology	4	test
OC 3	Anatomy and physiology of fish	4	test
OC 4	Anatomy and physiology of wild and hunting animals	4	test
OC 5	Agrarian policy	4	test
OC 6	Ethnoculturology	4	test
OC 7	Microbiology of meat	4	test
OC 8	Cell biochemical processes	4	test
OC 9	Neurophysiology with the basics of zoopsychology	4	test
OC 10	Sanitary Microbiology	4	test
OC 11	Sanitary Virology	4	test
OC 12	Organic animal husbandry	4	test
OC 13	Organization of laboratory work	4	test
OC 14	Fish Microbiology	4	test
OC 15	Medicinal plants in veterinary medicine	4	test
OC 16	Methods of mycological research	4	test
OC 17	Anesthesiology	4	test
OC 18	Management and marketing in veterinary medicine	4	test
OC 19	Fundamentals of veterinary pharmacy	4	test
OC 20	Veterinary hematology	4	test
OC 21	Diet of small pets	4	test
OC 22	Biotechnology in Veterinary Medicine	4	test
OC 23	Visual diagnosis of animal diseases	4	test

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits ECTS</b>	<b>The final control</b>
OC 24	Technical microbiology	4	test
OC 25	Dermatology and endocrinolog	4	test
OC 26	Veterinary nephrology and urology	4	test
OC 27	Biosecurity and Biosafety	4	test
OC 28	Biochemical analysis in the clinic (by species).	4	test
OC 29	Veterinary Support of Beekeeping	4	test
OC 30	Veterinary support in poultry	4	test
OC 31	Diseases of fur animals	4	test
OC 32	Reproductive biotechnology	4	test
OC 33	Zoonoses and the concept of One health	4	test
OC 34	Veterinary transfusiology	4	test
OC 35	Management of the health of the herd of animals.	4	test
OC 36	Veterinary oncology	4	test
OC 37	Clinical pharmacology	4	test
OC 38	Veterinary Neonatology	4	test
OC 39	Antibiotic resistance and rational antibiotic	4	test
OC 40	Diseases of aquarium fish	4	test
OC 41	Reproductive sonography of ruminants	4	test
OC 42	Diseases of dogs and cats	4	test
OC 43	Intensive care and resuscitation of animals.	4	test
OC 44	Organization of veterinary business	4	test
OC 45	Diseases of exotic animals.	4	test
OC 46	Tropical Veterinary Medicine	4	test
OC 47	Veterinary andrology	4	test
OC 48	Infectious diseases of fish and aquatic organisms	4	test
<b>Total</b>		<b>182</b>	
<i>Optional Block 2 (the applicant chooses one component)</i>			
OC 1.1	Preventive veterinary technologies of Animal Health Providing	22	exam
OC 1.2	Veterinary health support of horses	22	exam
OC 1.3	Veterinary health support of dogs and cats	22	exam
OC 1.4	Veterinary health support of pigs	22	exam
OC 1.5	Veterinary health support of sheep and goats	22	exam
OC 1.6	Veterinary health support of exotic animals and fur animals	22	exam
OC 1.7	Veterinary health support of poultry	22	exam
OC 1.8	Veterinary health support of poultry	22	exam
OC 1.9	Veterinary laboratory diagnostics	22	exam
OC 1.10	Veterinary provision of public health	22	exam
OC 1.11	Scientific research in veterinary medicine	22	work protection
<b>Total</b>		<b>22</b>	
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optinal subject 1	4	test
OCP 2	Optinal subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>The total amount of compulsory components</b>		<b>270</b>	
<b>The total amount of optional components</b>		<b>90</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>360</b>	

**Annotation of disciplines in the curriculum**

**GENERAL TRAINING CYCLE  
Compulsory components of EPP**

**Inorganic Chemistry.** The chemical structure of matter, the basic theory of chemical processes, complex compounds. Chemistry of inorganic elements and their role

in the life of the body, the basis of chemical isotopes. Volumetric analysis, acid-base titration, redoxometry, complexometry, physical and chemical analysis, photometry, chromatography.

**Biophysics.** Physical and physico-chemical processes occurring in biological systems, the fundamental phenomena that form the basis of nature. Physical characteristics and physical properties of farm animals body.

**Latin language (terminology).** Latin grammar, spelling and special terms for Veterinary Medicine.

**Organic Chemistry.** The structure, preparation methods, physical and chemical properties, and the use of main organic compounds classes - carbohydrates, alcohols, aldehydes, ketones, amines, acids, heterocyclic compounds. Properties of amino acids, carbohydrates, lipids, nucleic acids and proteins.

**Genetics.** Explore basis of heredity and variation of organisms, reveals principles of storage, transmission and realization of genetic information, including cytological and molecular basis of heredity, inheritance patterns of sex characteristics (defects, diseases), linked inheritance, foundations genetic engineering, population and clean lines, the foundations of immunogenetics.

**History of Ukrainian nationhood.** The study of the objective laws of the development of the Ukrainian state. The adoption of the Constitution of Ukraine, analysis of common problems of Ukraine's transition to a social market economy and integration into the world community.

**Etnocultorology.** Ukrainian spiritual culture as part of world cultural process. The role of culture in shaping the personality and life of the Ukrainian people. Objective and subjective factors increase standards of culture at the present stage of Ukraine

**Ukrainian language (for professional purposes).** Scientific terminology, terms and their use, specific for veterinary specialty and restitution of previously acquired knowledge.

**Philosophy.** The system of philosophical knowledge of the main philosophy parts, developing the type of consciousness that is based on constructive and critical approaches to the ideals of humanism.

**Foreign language.** Integrated learning of language (reading, listening, speaking). Study of communication and translation.

**Physical Education.** Basics of maintaining a healthy lifestyle and the benefits of physical activity, perform basic elements of popular sports game, maintaining the level of physical skill and physical health.

**Agrarian policy.** The discipline introduces the principles of formation of policy in agrarian sphere, gives the possibility to gain proficiency in methodical and methodological principles of the development and realization of the complex of actions concerning support and provision of the development of agriculture in the system of inter-branch links in national economy as well as estimate from the theoretic position practical actions of state structures concerning regulation of the agricultural production of the country.

Both national and foreign experience is studied. In case of mastering the material students get the possibility to form their own view on professional base about processes and phenomena happening in agrarian sector of the state economy.

**Life Safety.** The theoretical basis of labor. The legal basis for the protection of animal husbandry and veterinary services workers. Fundamentals of industrial hygiene. Safety in livestock and poultry. Fire safety in livestock and poultry.

**Methodology and organization of scientific research on the basics of intellectual property.** The course examines main stages of Ukrainian science and higher education, their current state, especially degreeal reform of higher education with a focus on masters training, as well as candidates and doctors of sciences. Methods of research

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(historical, biological, zootechnical, veterinary, special) used in veterinary medicine, bioethics of doctor, conduct, researcher and scientist, selection of topic and forming tasks of research, invention and patent.

**Business foreign language.** Integrated learning of language professional activity. Types of language activity: reading, listening, speaking. Formation of dialogue and monologue speech skills preparation of students for professional communication in speech and writing in a foreign language. Study how to translate special texts as a way of presentation of adequate scientific information content. Formation of knowledge, necessary skills and abilities which ensure masters communicative ability in the field of professional communication: in particular, the ability to organize and hold a scientific conference in the specialty, to participate in the conference and make a scientific report, a business meeting or negotiations with foreign colleagues, partners.

**Personal legal culture.** One of the features of a legal state is the high level of legal culture of the citizens characterized by the common respect to the law, sufficient awareness of its norms and the ability to apply them in all life situations. The discipline «Legal culture of a personality» will permit students to develop legal thinking and cultural style of legitimate behavior in everyday life in interpersonal relations as well as in communication with representatives of court and law enforcing authorities.

## SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**History of Veterinary Medicine.** Veterinary history of primitive society; in old Russian principalities in IX-XIV century; in Russia in XVIII and XIX century. The history of veterinary medicine in the USSR. The current state of veterinary medicine in Ukraine.

**Ecology in veterinary medicine.** Fundamental properties (functions) of life. The body and the environment. Patterns of development, and the existence of the biosphere. Circulation of matter and energy in the biosphere. The structure of modern ecology.

**Animal anatomy.** The structure of the domestic animals organism in close connection with its functions. The locomotor apparatus. Osteology. Syndesmology. Myology. Integument. Splanchnology. The digestive apparatus. Breathing apparatus. Urogenital apparatus. Angiology. Endocrine glands. The nervous system. Senses. Features poultry anatomy.

**Cytology, histology, embryology.** The doctrine of cell. General embryology. The doctrine of tissue. Histology of organs and systems.

**Basics of breeding animals.** Breeding of farm animals. Husbandry. Pig. Sheep. Poultry. Horse breeding.

**Veterinary Microbiology.** Systematics, morphology and physiology of microorganisms spread in nature, their role in transformation of matter in nature. Impact of environmental factors on microorganisms. Infection. Immunology. Types and features of pathogens: bacteria, bacilli, fusobacterium and actinomycetes, mycobacteria, vibrio, spirochetes, mycoplasmas, rickettsia and chlamydia, microscopic fungi.

**Biochemistry of animals with basics of physical and colloid chemistry.** Physical and chemical properties of organic compounds, solutions. The structure, function and metabolism of proteins, fats, carbohydrates, amino acids, nucleic acids, vitamins, enzymes, macro- and micronutrients that are foundation of body tissues biochemical processes structure, underlying functional activity of individual organs and body systems.

**Physiology of animals.** Physiological processes in animals, incl. Physiology of blood, lymph, heart and circulatory, physiology of respiration, digestion, metabolism and energy, thermoregulation, excretion, endocrine physiology, reproduction, lactation, muscular and nervous systems, higher nervous activity analyzers.

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**Animal alimentation.** Scientific bases of farm animals feeding, nurture and nutritional assessment needs of animals in full feeding factors. The physiological significance of individual nutrients of food and concept of food usefulness, alimentation and nutritional assessment of diet.

**Veterinary Immunology.** Examines the central and peripheral organs of the immune system, mechanisms of immune responses, antibodies and antigens. Immunological diagnosis of infectious diseases. Serological diagnosis of disease response.

**Veterinary virology.** Physical structure and chemical composition of vibrios and viruses. Taxonomy, reproduction and cultivation of viruses. Effects on viruses of physical and chemical factors. Ecology of viruses. Genetics of viruses. Pathogenesis of viral diseases of animals. Features of antiviral immunity. Specific diagnosis and prevention of viral diseases of animals.

**Hygiene of animals.** Studies hygienic and veterinary-sanitary requirements for environmental factors, livestock buildings, nutrition, water, soil, air, rules and hygienic requirements for housing, feeding and maintenance of different species and age-sex groups of animals.

**Animal welfare, ethology and professional ethics.** Animal welfare - a system of measures, receptions and requirements that provide a humane attitude towards them in their cultivation, maintenance, care and exploitation in the production of various types of livestock products. Ethology is a science about the behavior of animals in specific conditions of maintenance, care and exploitation. Professional ethics regulates the relationship between veterinary specialists, as well as the owner of the animal and the animal itself.

**Pathological physiology.** General patterns of emergence, development and completion of the disease. Nosology. Role of reactivity in pathology. Classification characteristics, of typical pathological processes; inflammation, disorders of tissue growth, typical regional blood flow, metabolism, acid-base balance, thermoregulation; hypoxia, starvation. Adaptive-compensatory reactions in animals aimed at eliminating violations. Pathological physiology of organs and systems.

**Operative surgery, topographic anatomy and anesthesiology.** Study of surgical operations due to the topographic anatomical features of animals' specific body parts. Anesthesiology; fixing, overthrow and medical reassurance. Technology and organization of mass operations. Prevention of infection in the doctor of veterinary medicine work. Injection and puncture. Desmurgy. Surgical operations on parts of animal bodies.

**Clinical diagnostic of internal diseases of animals.** Methods and clinical research of various animals, their application in the study of individual organs and systems; symptoms, syndromes and main stages of disease recognition. Special methods of individual organs and systems investigation, Detection of diseases in animals.

**Pharmacology.** Pharmacodynamics of drugs. Conditions affecting the action of drugs. Key features and pharmacokinetic characteristics of different groups of drugs, their dosage. Recipe and technology of dosage forms.

**Pathological anatomy and forensic veterinary.** Pathological anatomy and forensic veterinary medicine is a discipline that studies the material bases of pathological processes, the causes and mechanisms of its origin, development and completion, nosology, morphofunctional characteristics, and features of the pathologic anatomical diagnosis of diseases. Pathological anatomy is important for the training of doctors of veterinary medicine with the pathoanatomical diagnosis of animal diseases, for monitoring therapeutic and preventive work, assessing the effect on the death of animals on the conditions of their feeding, housing and exploitation.

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**Parasitology and invasive disease.** The emergence, development and extinction of invasive animal diseases. General parasitology. Veterinary Helminthology, Entomology, Arachnology, protozoology.

**Veterinary radiobiology.** Biological effects of ionizing radiation. Radial lesion of animals. Radioecology and toxicology of radioactive substances. Radiological and veterinary-sanitary examination of veterinary supervision objects. The use of ionizing radiation in animal husbandry and veterinary medicine.

**Clinical Biochemistry.** Use of various biochemical research methods of animal clinical status, especially their use in study of individual organs and systems in order to establish an accurate diagnosis and develop treatment and prevention of diseases. Biochemical tests and symptoms (syndromes), metabolic disorders and other animal diseases.

**Obstetrics, gynecology and animal reproduction biotechnology.** Physiological basis and technology of obtaining sperm. Physiology and biochemistry of sperm. The technology of artificial insemination of females and embryos transplantation. Andrology. Physiology and pathology of pregnancy, inception and the postpartum period. Operative Obstetrics. Obstetrical and gynecological check-ups. Disease of the newborn. Diseases of udder. Gynecology. Infertility in females and males.

**Veterinary toxicology.** Toxicology of mineral poisons, phosphorus and organochlorine compounds. Organic derivatives of mercury. Toxicology of phenoxy acid and phenol. Toxicology of toxic substances (plant and animal origin). Poisoning of animals with poor quality food. Chemical and toxicological analysis.

**General and special surgery.** Veterinary traumatology. Surgical infection. Diseases of skin, muscles, tendons, tendon sheaths and bursa, blood vessels, joints. Damage to nerves and brain. Tumors. Diseases in the area of head, neck, withers, back and chest wall, abdomen, pelvis and tail. Andrological disease. Veterinary orthopedics .

**Food Safety and Hygiene.** The discipline studies the basics of legislation on safety and certain quality related characteristics of food and feed, control of hygiene requirements of meat and meat products, milk and dairy products, fish and fish products, eggs, plant products and feed production chain.

**Domestic animal diseases.** Internal diseases of farm animals, their etiology, pathogenesis, symptoms, course, diagnosis, treatment and prevention; laboratory studies. Diseases of young animals. Diseases of poultry. Diseases of fur-bearing animals, rabbits and dogs.

**Epizootology and infectious diseases.** Infection and Immunity. Evolution and classification of infectious animal diseases. Treatment and prevention of infectious diseases of ruminants, pigs, horses, birds, calves, dogs and fur animals, bees and fish. Veterinary Health. Diseases, common to several species of animals and people.

**Organisation of veterinary business, national and international veterinary regulations.** Organisation of veterinary business, national and international veterinary regulations Legislation on veterinary medicine in Ukraine. Organization and logistics of veterinary services and veterinary control in districts, cities and farms. Planning, organization and economy of veterinary measures. Veterinary accounting, reporting and record keeping. International veterinary organizations and veterinary services in some foreign countries. Basis of EU Legislation on food and veterinary medicine. Implementation of European regulations on food and veterinary surveillance in the EU.

### ***Optional components EPP***

#### ***Free choice according to specialty***

**Politology.** The science of the laws of development and functioning of political life of society, the mechanisms of political power, the management of political processes.

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Discipline provides research on the essence, character, laws of the sphere of politics, political reality, political life of the individual and society. Familiarizes applicants with the peculiarities and patterns of the political process, the functioning of the political system and power, the essence, forms and methods of activity of policy subjects.

**Conflictology.** The discipline provides applicants with a system of scientific knowledge of conflict theory, which will create an opportunity to develop the creative personality of the specialist. Promotes the formation of skills: to take into account the basic mental, socio-psychological and psycho-physiological manifestations of personality in management, constructively resolve conflicts and prevent them in professional activities; to promote the formation of the necessary professional qualities of future managers. The discipline focuses on developmental, scientific and methodological activities; its study contributes to the solution of typical tasks of the future leader.

**Anatomy and physiology of fish.** The discipline studies the anatomy of fish by the method of fish preparation develops in applicants the ability to find individual organs and their parts, both in pathological autopsies of dead fish and live fish in diagnostic and therapeutic manipulations.

The task of studying the discipline is to study the structure and shape of the body of fish and fish; structures of fish bodies on separate sections by devices or systems; ability to differentiate features in the structure of the fish skeleton (by its sections); study of the muscular system and its functions during movement and static position of fish; structure, topography and features of the digestive system of fish and fish-like in comparative aspect; structures of the respiratory system and urogenital system of fish; study of the structure and location of the organs of the cardiovascular and nervous systems of fish; knowledge of the structure and location of the senses of fish.

**Anatomy and physiology of wild and hunting animals.** The discipline forms an idea of the laws, features and fundamental differences in the structure of the body of wild and hunting animals, as well as the study of the structure of their organs and systems of different species of animals based on comparisons with domestic animals. The main tasks of studying the discipline are: creating an idea of the organism as a whole; its structure is studied in the relationship of organs, their devices and systems, as well as the interdependence of structure and function against the background of development in onto- and phylogeny; the discipline studies the structure and function of the body of wild and hunting animals.

The study of the discipline develops in applicants the ability to find individual organs and their parts, both on the carcasses of dead animals and in living animals, to navigate the differences between the entrails from domestic animals, and so on.

**Agrarian policy.** The discipline provides an opportunity to master methodological foundations of development and implementation of a set of measures to support and ensure the development of agriculture in the system of intersectoral relations in the national economy, as well as to assess the theory of practical actions. Studying the discipline "Agrarian Policy" will increase the level of general economic training, developing their skills of scientific and analytical study of agricultural problems from the standpoint of national interests and the interests of agricultural producers, provides an opportunity to master theoretical approaches to developing and implementing, on the other hand - gives grounds to comprehend and evaluate the practical actions of government agencies at a particular historical stage of life.

The formation of a market environment in the agricultural sector requires the training of specialists with a broad economic worldview, who could quickly solve the main problems of agro-industrial production on the basis of market relations. At the same time, the role of state regulation of agricultural production and agribusiness in general is growing in Ukraine's transition economy, which is reflected in the state's agricultural policy. That's

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why in order to train highly qualified specialists in the field of agro-industrial complex it is necessary to give them a full understanding of agricultural policy, forming modern and deep knowledge of theoretical approaches to its formation and practical aspects of implementation.

**Ethnosculturology.** The discipline studies the main trends and forms of ethnocultural development of the Ukrainian people from ancient times to the present; provides raising the ethnic awareness of higher education students and their training with a view to future work in a multicultural environment; contributes to the study of the peculiarities of the Ukrainian ethnic group, the formation of a sense of ethnic identity, pride in belonging to the Ukrainian nation, instilling a deep interest in the spiritual treasury of the Ukrainian people.

**Microbiology of meat.** The purpose of studying the discipline is the formation of future specialists with deep theoretical knowledge and practical skills in taxonomy, morphology and physiology of beneficial, sanitary, opportunistic and pathogenic microorganisms that affect the quality and safety indicators of meat and meat products, as well as methods of their indication and identification; determining the role of microorganisms in various processes of processing and storage of raw meat.

The main objectives of the discipline are:

- study of the main ways and sources of microbial contamination of meat and meat products, morphological and physiological characteristics of the main groups of microorganisms that affect the quality and safety of meat and meat products;
- study of the influence of technological regimes and conditions of raw meat processing on the quantitative and qualitative composition of the microflora;
- study of the basics of microbiological and sanitary control at the enterprises of the branch and acquaintance with the safety criteria and sanitary norms of raw meat products according to the current state standards.

**Cell biochemical processes.** The course considers the biochemical processes of the cell (both eukaryotic and prokaryotic). Particular attention is paid to the structure of cell membranes, intracellular organelles, cytoskeleton and mitochondria and the processes of intercellular interaction, the mechanisms of intercellular and intracellular signaling.

**Neurophysiology with the basics of zoopsychology.** The course presents a brief historical essay on the development of neurophysiology; the structure and functions of the nervous system in the evolutionary context are considered; modern achievements in the study of neuronal functions and structural and functional organization of the central nervous system. There are presented the latest data on the structure of the membrane of neurons, electrical phenomena that occur on the membrane are presented. This course also introduces the functional characteristics of the departments of the brain of animals, the physiological basis of the processes of perception of external information, the formation of motor commands, ideas about the brain mechanisms of mental functions and behavioral reactions of animals.

**Sanitary Microbiology.** The purpose of the discipline "Sanitary Microbiology" is to study the microflora of the environment, in particular, soil, water, air, food, microflora of living organisms. Also, the study of the principles and methods of sanitary and microbiological research, the concept of sanitary-indicative microorganisms, the study of the microflora of various objects.

The task of the discipline: the study of the history of the development of sanitary microbiology; groups of sanitary-indicative microorganisms, the nature and causes of microbial contamination of soil, water, air, food, human exposure; methods of indication of sanitary-indicative and pathogenic microorganisms; methods of indication and identification of sanitary-indicative microorganisms; methods for detecting pathogenic

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microorganisms; sanitary and microbiological standards, legislative documents of Ukraine on the preservation of human health and environmental protection.

**Sanitary Virology.** Currently, great importance is attached to the study of environmental objects, namely: air, water, household items and food for the content of viruses, as the latter can be a source of viral diseases. Thus, one of the factors in the transmission of viral infections in the food chain is milk and dairy products, and vegetables grown on contaminated soils and used for irrigation with a large number of different pathogens directly or indirectly affect human health and the environment. The role of the air in the spread of respiratory viral infections should be singled out. Therefore, the task of sanitary virology is to study the methods of laboratory diagnosis of viral infections in animals and sanitary and virological research of the environment and food, development of non-specific preventive measures to limit the circulation of pathogenic viruses in the environment.

**Organic animal husbandry.** Discipline contributes to the formation of humane attitudes and principles of caring for animals, taking into account the natural needs and ethological characteristics of each animal species. Proper economic efficiency and cost-effectiveness of production, disease prevention and livestock loss require effective practical and scientific support, as organic animal husbandry is not just subsistence farming, but a combination of the latest technology and high production culture to produce the highest quality organic products.

Discipline forms logical thinking in applicants, promotes understanding of sustainable nature, conservation of the environment and biodiversity of organisms, animal welfare, the need to eat quality and safe products, the introduction of new technologies for growing and producing products.

**Organization of laboratory work.** The discipline involves the study of higher education students the necessary theoretical knowledge and practical skills to ensure the quality of laboratory tests based on the improvement and high reliability of research methods, as well as providing the necessary laboratory information for practical veterinary medicine; apply state and international standards for the organization of clinical diagnostic laboratories; assess the suitability of methods, traceability and uncertainty of the obtained measurement results; to teach students to create safe conditions for biological safety in the laboratory, to be familiar with laboratory utensils, equipment, analytical instruments, methods and techniques of laboratory analysis.

**Fish Microbiology.** The purpose of studying the discipline "Fish Microbiology" is to form in future specialists deep theoretical knowledge and practical skills in taxonomy, morphology, physiology, indication and identification of microorganisms that affect the quality and safety of fish and fish products.

The task of the discipline is to study the patterns and features of contamination of fish with microorganisms;

- acquisition of practical skills in microbiological research of fish and fish products, study of morphology, physiology of the main groups of microorganisms that affect the quality and safety of fish products, methods of indication of sanitary-indicative and pathogenic microorganisms

- study of the influence of technological regimes and conditions of fish processing on the quantitative and qualitative composition of the microflora;

- study of the system of preventive measures to prevent the occurrence of food poisoning in people when eating substandard fish products.

- study of the basics of microbiological and sanitary control at the enterprises of the branch and acquaintance with safety criteria and sanitary norms of fish products according to the current state standards.

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**Medicinal plants in veterinary medicine.** The possibilities of using floristic stocks as medicines of natural origin in the practice of veterinary medicine for treatment of sick animals and prevention of certain diseases are address. Also materials on the technology of collection, storage and processing of medicinal plant raw materials, chemical composition, pharmacological action, assignments, indications and contraindications to the use of drugs made of it in various dosage forms are set out.

**Methods of mycological research.** Diseases of fungal etiology are widespread and cause significant economic damage to the livestock industry. The aim of the discipline is to deepen the knowledge of higher education students about the morphological structure of micromycetes, principles of taxonomy, features of major taxonomic groups of fungi, the role of microscopic fungi in the occurrence of chronic toxicosis in animals, methods of cultivating fungi, as well as mastering the methods of laboratory diagnosis of diseases they cause.

**Anesthesiology.** Different types, methods and means of general and local anesthetics of animals are studied. Modern methods of controlling the condition of an animal during anesthetic support and possible complications. Means and methods of correction of critical states of an organism of an animal during anesthetic support.

**Management and marketing in veterinary medicine.** Management and marketing in veterinary medicine is an optional component of the educational program "Veterinary medicine" and provides the basis for managing enterprises for the design, manufacture, sale and use of veterinary drugs in accordance with international standards and national legislation. Teaches practitioners to manage human and material resources, as well as epizootic, infectious and pathological processes in a relatively stable veterinary well-being and in the event of extreme epizootic situations. Provides an opportunity to master the basics of information and communication activities and public relations in the system of activities of veterinary enterprises.

**Fundamentals of veterinary pharmacy.** Theoretical foundations and practical issues of drug manufacturing in the conditions of a drugstore and their industrial production are studying, as well as requirements for wholesale and retail trade in veterinary medicaments and drugs, regulatory frameworks for the development, implementation and production of drugs in accordance with the requirements for their quality, conducting preclinical and clinical trials of new veterinary drugs.

**Veterinary hematology.** The discipline is designed for in-depth study of current issues of veterinary hematology, which are necessary for a veterinary practitioner to understand the mechanisms of formation of blood components in healthy animals and in various pathological disorders. Studying the materials of the discipline will allow applicants to gain skills in establishing a competent conclusion on blood tests, detecting hidden changes in tissues, organs and systems of the body, identifying complications arising from a pathological condition, differentiating similar diseases, monitoring the effectiveness of treatment of sick animals and predicting the end of diseases.

**Diet of small pets.** The study of the discipline involves comprehensive learning of the current state and prospects for the development of veterinary nutrition of small domestic animals, the scientific basis of rational nutrition of animals depending on their physiological characteristics, age and health.

**Biotechnology in Veterinary Medicine.** The task of the course is to acquaint students with the basics of modern technologies based on the use of biological processes, to obtain basic skills in the biotechnology laboratory.

During the training, students master the basics of molecular biology - the fundamental basis of modern biotechnology; elements of construction of vector constructions of genetic engineering, technologies of genetically engineered antiviral

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vaccines, technologies of production of antibiotics, preparations of amino acids, diagnostic preparations (PCR), vaccines, immunomodulators.

Students will gain knowledge about the achievements in embryo transplantation; study the basics of traditional technological processes in the production of biological and chemotherapeutic drugs, get an idea of the state of these industries in modern biotechnological enterprises. This knowledge will form in future professionals the idea of the possibility of using biological processes and biological objects for the diagnosis, prevention and treatment of a number of animal diseases; creation of strains of microorganisms that produce various chemical compounds, antibiotics, polymers, amino acids and enzymes, sequencing of the genome of microorganisms, etc.

In addition, attention will be paid to the creation of genetically modified organisms and the biological safety of their use; methods of regulating the sex of animals, determining the sex of early embryos, and establishing family ties between them using molecular genetic methods.

**Visual diagnosis of animal diseases.** The discipline studies special methods of diagnosing internal diseases of animals. Particular attention is paid to the basics of X-ray diagnostics and sonography, as well as the practical application of the acquired skills for the diagnosis of internal diseases of domestic animals. Processing the materials of the discipline will also allow applicants to gain skills in drawing up (according to standard protocols) conclusions on the results of radiographic and / or ultrasound examinations of the animal.

**Technical microbiology.** The purpose of studying the discipline "Technical Microbiology" is to form in future experts scientific worldview knowledge about the diversity of the world of microorganisms, the breadth of their distribution in the environment, food, industrial goods, as well as their importance as potential causative agents of food poisoning; study of scientific bases of microbiology on use of microorganisms in various production processes, including many branches of food manufactures.

The main objectives of the discipline are:

- study of morphology, physiology, ecology of microorganisms that affect the quality of food and industrial goods in their manufacture, storage, transportation and sale;
- study of the most important biochemical processes involving microorganisms, the role of microorganisms in the cycle of substances in nature and changes in the quality of food under the action of microorganisms during storage ;
- study of the impact on microorganisms of various environmental factors in order to regulate microbiological processes in the production and storage of food and industrial goods;
- development of basic methods of control of microbiological and sanitary-hygienic condition of production.

**Dermatology and endocrinology.** The discipline provides the formation of knowledge of the most common skin and endocrine diseases of domestic and productive animals, their clinical manifestations, species characteristics, diagnostic methods, approaches and modern treatment protocols, measures to prevent the development of these pathologies, as well as effective use of practical skills in professional activities.

**Veterinary nephrology and urology.** The discipline studies the physiology of urine products, pathology of the urinary system of small pets, their etiology, pathogenesis, symptoms, diagnosis (urine analysis, ultrasound, native and contrast radiography, CT and MRI studies), treatment and prevention, and diseases related with dysfunction of these glands.

**Biosecurity and Biosafety.** Biosecurity in the context of sustainable livestock is one of the most important components of food, environmental and national security of

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Ukraine. The implementation of biosafety policy should be carried out by creating a system that will detect, predict, prevent and combat existing threats of biological origin.

The aim of the course "Biosecurity and Biosafety" is to study students' concepts of biosecurity and biological protection with elements of biological terrorism.

Tasks of the discipline: study of basic issues of biosafety and protection. The basis of the discipline is the European experience of biosafety systems in industrial enterprises and in countries. Understanding the system of formation of the problem of biological security and cases of use of biological weapons. Consideration of the use of pathogens of natural diversity. Chimera virus. Nipah virus. Ebola virus. Smallpox virus, Anthrax. As well as readiness to assess and manage biosafety crises

The technology of decontamination and felling of animals will also be studied.

In addition, the discipline will study laboratory biosecurity and biorisk assessment in different conditions (selection, transfer and transportation of biological materials, research and disposal of biomaterial).

**Biochemical analysis in the clinic (by species).** This course involves the formation competencies competencies at higher education graduated students in laboratory diagnostics of animal diseases of various species, namely: methodology of biochemical studies of various biological material obtained from sick animals, and comprehensive assessment of biochemical constellations to determine the degree of dysfunction of the whole organism and individual bodies and systems, the correct interpretation of the results, as well as ensuring the quality management system of biochemical laboratories.

**Veterinary Support of Beekeeping.** The course is an important part of knowledge in ensuring the well-being of the beekeeping industry and the ecological and social well-being of the population of Ukraine.

Beekeeping provides the population with valuable products - honey, wax, pollen, royal jelly and bee venom. Ukraine ranks fifth in the world in honey production.

However, it does not fully use its export potential of honey and bee products. One of the factors influencing the limited export of honey is the actual lack of specialized laboratories for the evaluation of bee products, and especially honey at the level of EU requirements. The production process must be considered complete if the products produced have been monitored in accordance with the appropriate production conditions, have a quality certificate and are delivered to the consumer in a form convenient for consumption or storage.

The issue of compliance with the quality of beekeeping products is quite relevant and has many factors:

1. Tracking the transparency of origin;
2. Supervision of the production process;
3. Maintenance of veterinary and sanitary condition;
4. Epizootological well-being;
5. Control of the balance of veterinary drugs and monitoring of pharmacological substances;
6. Control of pollutants of pesticide residues, herbicides;
7. Assessment of the ecological state of the state of beekeeping and beekeeping products.

Under these conditions, there is a shortage of specialists specializing in bee pathology in Ukraine. In modern conditions of farming focused on honey exports to EU countries, the veterinary specialist must be familiar with the requirements of international organizations on product safety, conditions of its production with an environmental component and of course principles, norms and rules for the use of medicines in

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beekeeping. The discipline is provided with the textbook "Veterinary Support of Beekeeping" for students of the faculties of Veterinary Medicine.

**Veterinary support in poultry.** With modern poultry farming, as industrial, homestead or individual, intensification of agricultural production and changes in housing conditions, there are circumstances that require correction of homeostasis, immunobiological reactivity and non-specific and specific immunity in birds. Laboratory-diagnostic measures in industrial poultry farming, biosafety measures and vaccine prevention of bird diseases are especially relevant.

Improving the productivity and cost-effectiveness of poultry farming requires highly qualified specialists to conduct both planned and operational monitoring of birds health at industrial sites in the environment and in laboratories with modern equipment. The specialist must have the skills to respond effectively to the epizootic situation and the ability to plan and monitor the health of birds and the quality of poultry products.

In order to expand production relations with European countries, the specialist needs skills and knowledge of the measures of the economic component of veterinary health and welfare, which reduce the cost of poultry products and improve their quality. The course is provided with a textbook "Laboratory Diagnosis and Vaccine Prevention of Bird Diseases."

**Diseases of fur animals.** Biology and keeping of rabbits and the main species of fur animals are considering. The most common parasitic diseases of fur animals and rabbits, features of these diseases, modern methods of their diagnosis, treatment and prevention are studying.

**Reproductive biotechnology.** The biological properties of germ cells and methods of manipulation with them, the processes of fertilization and development of embryos carried out in vitro are studied. The course is designed to highlight the main issues regarding the peculiarities of the basics of various embryological and cellular techniques and assisted reproductive methods in veterinary medicine and biology.

**Zoonoses and the concept of One health.** The aim of the discipline "Zoonoses and the concept of One health" is to study students' concept of "One Health" - cooperation between WHO, FAO and OIE on the interface "man-animal-environment" in the control of zoonoses, as well as European experience in risk management zoonoses.

Tasks of the discipline: study of zoonoses of bacterial origin (Bacterial zoonoses of productive animals, Bacterial zoonoses of domestic and exotic animals. Natural-focal and vector bacterial zoonoses), zoonoses of viral origin (Viral zoonoses of productive animals, viral and zoonoses of domestic animals). vector zoonoses and current threats of viral zoonoses in industrial livestock, risk detection and control.

As well as food zoonoses (characteristics of the most common food zoonoses (bacterial, viral, parasitic), ways of contamination of food) and investigation and analysis of outbreaks of the most common food zoonoses.

In addition, the discipline will study crisis preparedness and management (Crisis Preparedness & Management) and risk management of zoonoses. National programs for monitoring and control of biological hazards - zoonotic agents. Analysis of the epidemiological situation and monitoring of zoonoses: analysis of monitoring and final reports of the EU, jointly prepared by the European Food Safety Authority (EFSA) and the European Center for Disease Prevention and Control (ECDC).

**Veterinary transfusiology.** The peculiarities of blood donation and protocols of whole blood and blood components transfusion in different species of animals are studied. Methods of blood transfusion in animals at different pathological conditions. Immediate and distant reactions of the animal-recipient after blood transfusion.

**Management of the health of the herd of animals.** Methods of optimizing the herd management system and health problems at an early stage of the disease, reducing

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the losses associated with the treatment and culling of animals are studied. The discipline is designed to highlight the main issues of animal health to identify and eliminate animal health problems, optimize animal reproduction, reduce labor costs, which ultimately leads to improved overall economic performance of the farm.

**Veterinary oncology.** In this course the peculiarities of oncogenesis and types of tumors in animals, the main manifestations of benign and malignant tumors and their clinical signs, general principles of tumors' diagnosis in different species of animals are studied. Also describe methods of hyperplastic processes prevention in animals, surgical and medical methods of treating animals with tumors.

**Clinical pharmacology.** Features of action of new and traditional medicines on the body of sick animals are studying, as well as schemes of their application and doses given pharmacodynamics and pharmacokinetics depending on the peculiarities of the pathological process in animals of different species, which allows to make a reasonable choice of the necessary remedies for effective treatment of animals, disease prevention, stimulation of physiological functions.

**Veterinary Neonatology.** Anatomical, physiological features of newborn animals, a complex of diseases that occur in them are studied. Major diseases: umbilical sepsis, calf asphyxia, malnutrition, umbilical cord bleeding, urachus fistula, congenital absence of anus and rectum, meconium retention in newborns. Their manifestation, causes, clinical signs, general principles of diagnosis, clinical and surgical methods of treatment and prevention of neonatal pathology in animals.

**Antibiotic resistance and rational antibiotic.** Issues of mechanisms of action of antimicrobial drugs and mechanisms of resistance development to them are considering along with determining the sensitivity of microorganisms to antibiotics by phenotypic characteristics and molecular biological methods in order to rationally choose the optimal remedies and schemes of antibiotic therapy, as well as alternative drugs the application of which reduces the risks of antibiotic resistance developing.

**Diseases of aquarium fish.** Fish is a special large group of animals, which is largely related to the peculiarities of living in the aquatic environment and requires constant study. Keeping aquarium fish forms the student's idea of the aquarium as a holistic ecological system and laboratory, which is convenient to study the life and development of many aquatic organisms. It is important to expand the opportunity for students to conduct research in ichthyopathology, hydrobiology, ichthyology, embryology and breeding in indoor ponds. Students also have the opportunity to study the most common diseases of aquarium fish, both non-communicable pathologies and infectious diseases caused by bacteria, viruses and fungi. The organization of aquariums as research ichthyological laboratories forms the scientific basis for the development of aquaculture in Ukraine, the safety of aesthetic elements of comfort and coziness.

The aim of the course "Diseases of aquarium fish" is to study by students most common diseases of aquarium fish non-communicable and infectious pathology and to form an idea of the use of veterinary technologies to protect aquatic organisms in closed aquariums with freshwater and seawater.

The theoretical part of the discipline provides detailed information about the pathogens of infectious diseases of aquarium fish and mechanisms of their transmission, epidemiological data, age susceptibility, sources and reservoirs, methods of infection. This information is structured on the characteristic clinical signs, forms of their manifestation, the most characteristic pathological changes, modern and new methods of laboratory diagnosis, treatment and prevention of diseases. The practical part of the discipline "Diseases of aquarium fish" forms an algorithm of actions of the future veterinarian in case of disease, informs about the means of treatment and measures to control and prevent aquarium aquatic organisms.

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**Reproductive sonography of ruminants.** The discipline involves the formation of higher education students' competencies in the conduct of ultrasound examination of the reproductive system of ruminants during the sexual cycle and its synchronization, control of the postpartum period; changes that occur in the genital system in various pathological conditions; features of diagnosis of pregnancy in ruminants, sex determination and abnormalities of fetal and placental development; application of the sonography method in the reproductive biotechnology of ruminants, as well as for the control of the reproductive state of the broodstock.

**Diseases of dogs and cats.** The main mechanisms of occurrence, development and termination of diseases of dogs and cats and innovative approach in the diagnosis (including surgery), prevention and treatment of small animal diseases are study in this course. Also describes the summarizing the results of research on morphofunctional changes in animal body and methods of their surgical correction.

**Intensive care and resuscitation of animals.** The study of the discipline provides higher education students with theoretical knowledge and practical skills in the methodology of data analysis of clinical and laboratory studies, diagnosis and treatment of the most common critical conditions in animals. This course includes learning of the basic principles of initial stabilization and maintenance of vital functions of the whole animal body and a systematic approach to the most common critical conditions.

**Organization of veterinary business** The discipline studies the legal basis of business in Ukraine and provides practical skills in drawing up founding documents, as well as rules and procedures for obtaining licenses, printing, registration and registration of individuals and legal entities, opening bank accounts, taxation of small and medium businesses and more.

The main tasks of studying the discipline:

- to be used with the current legislative and regulatory documents on the organization of veterinary business in the country;
- to study the methods of preparation of veterinary, organizational and financial documents necessary for the creation and effective functioning of commercial veterinary organizations;
- to consider practical issues of veterinary entrepreneurship;
- to be able to have international experience in the field of veterinary business.
- teach the basic principles of marketing policy in the veterinary marketing.

**Diseases of exotic animals.** The discipline is aimed at deepening theoretical and practical knowledge of students on anatomical, topographical and physiological features of exotic animals; gaining of modern methods of clinical and instrumental research, diagnosis and treatment of exotic and wild animals which are kept in zoos, reserves, terrariums, special farms, the private sector and nature (even and odd-toed ungulates, tylopods, primates, predators, rodents, reptiles, ostriches, ornamental birds).

**Tropical Veterinary Medicine.** The discipline studies the features of the course, diagnosis, treatment and control of tropical diseases not only in the tropics but also in other countries, globalizes the problem of the likelihood of many tropical diseases in areas where they were not previously registered.

**Veterinary andrology.** The discipline studies the physiology and pathology of the reproductive system of males of different species. Provides for the formation of higher education competencies in the etiology, pathogenesis and modern clinical and laboratory methods for diagnosing pathology of the male reproductive system, the effectiveness of treatment and prevention of impotence in males.

**Infectious diseases of fish and aquatic organisms.** Implementation of sustainable development of aquaculture in Ukraine, as a separate type of agricultural activity in the system of agro-industrial production, depends on the epizootic and

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anthropogenic state of reservoirs and involves the application of modern knowledge and technologies of veterinary supervision in fish farming, quarantine, etc.

The purpose of teaching the discipline "Infectious diseases of fish and aquatic organisms" is the formation of future veterinarians in-depth theoretical and practical knowledge based on modern advances in science and practice of ichthyopathology, research methods and diagnosis of fish diseases.

In the process of studying the discipline "Infectious diseases of fish and aquatic organisms" students must master a set of theoretical and practical knowledge of hydrobiology, chemistry, physiology, morphology of aquatic organisms, as well as diagnosis, treatment and prevention of infectious diseases of fish and aquatic organisms. Prevention of fish diseases is becoming mandatory and is carried out not only at the immediate threat of the epizootic, but also at all stages of fish farming. Studying the patterns of occurrence and spread of fish diseases, their prevention are important tasks of modern fish farming, as their solution depends on the effectiveness of breeding aquaculture and preservation of fish products. In this regard, the role of the veterinary service is growing, the main tasks of which are the prevention and eradication of fish diseases, as well as the protection of humans and animals from infectious diseases, the source of which is fish used in food and feed.

#### *Veterinary health support for cattle*

**Veterinary preventive technologies of non-contagious diseases of cattle.** The discipline studies modern approaches to preventive veterinary measures for the occurrence of non-contagious pathology in cattle in farms of various forms of ownership; diagnosis of diseases (internal non-contagious, obstetric, gynecological, andrological, breast, surgical) different etiology and laboratory methods of research of biological material.

**Veterinary preventive technologies of contagious diseases of cattle.** The discipline studies modern approaches to preventive veterinary measures for the occurrence of contagious pathology (infectious and invasive) in cattle in farms of various forms of ownership; planning of anti-epizootic and antiparasitic measures; diagnosis of infectious and parasitic diseases of various etiologies. Significant attention is paid to laboratory methods of research of biological material.

**Hygiene of cattle maintenance.** The discipline studies modern technologies of growing young cattle; the control of hygienic conditions for keeping and feeding cattle at different stages of the reproductive cycle (dry period, maternity ward, lactation); udder hygiene - as one of the components of quality and safe products.

#### *Veterinary health support of horses*

**Veterinary preventive technologies of non-contagious diseases of horses.** The discipline studies modern approaches to preventive veterinary measures for the occurrence of non-contagious pathology in horses; diagnosis of diseases (internal non-contagious, obstetric, gynecological, andrological, surgical) of various etiologies and laboratory studies of biological material.

**Veterinary preventive technologies of contagious diseases of horses.** The discipline studies modern approaches to preventive veterinary measures for the occurrence of contagious pathology (infectious and invasive) in horses in farms of various forms of ownership; planning of anti-epizootic and antiparasitic measures; diagnosis of infectious and parasitic diseases of various etiologies. Significant attention is paid to laboratory methods of research of biological material. Vaccine prophylaxis of infectious diseases of horses, the use of serums, immunoglobulins, drugs with interferonogenic effect. Prevention of helminthiasis, arachnoentomoses, diseases caused by protozoa.

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**Hygiene of horse maintenance.** Mastering the discipline will provide an opportunity to acquire knowledge in the hygiene of feeding, maintenance, breeding, use and operation of horses.

*Veterinary health support of dogs and cats*

**Veterinary preventive technologies of non-contagious diseases of dogs and cats.** The discipline studies the preventive veterinary measures for the occurrence of pathology associated with metabolic disorders, hormonal disorders, vitamin and mineral nutrition in dogs and cats. Prevention of obstetric, gynecological pathology and impotence in dogs and cats, methods of hormonal regulation of the sexual cycle in bitches and cats. Traumatology, dentistry, orthopedics, microsurgery. Prevention of surgical pathology and modern technologies in veterinary surgery.

**Veterinary preventive technologies of contagious diseases of dogs and cats.** Discipline is aimed at studying modern methods of diagnostic research and preventive measures for infectious and invasive diseases of dogs and cats. In the process of studying, students will learn morphological features and the cycle of development of pathogens of diseases, their systematic position, etiology, pathogenesis and immunity in dogs and cats. Prevention of helminthiasis, arachnoentomoses, diseases caused by protozoa.

**Hygiene of dogs and cats maintenance.** Mastering the discipline will provide an opportunity to acquire knowledge in the hygiene of feeding and keeping dogs and cats.

*Veterinary health support of pigs*

**Veterinary preventive technologies of non-contagious diseases of pigs.** The discipline studies modern approaches to preventive veterinary measures for the occurrence of non-contagious pathology in pigs in farms of various forms of ownership; diagnosis of diseases (internal non-contagious, obstetric, gynecological, andrological, surgical) of various etiologies and laboratory studies of biological material.

**Veterinary preventive technologies of contagious diseases of pigs.** The discipline studies modern approaches to preventive veterinary measures for the occurrence of contagious pathology (infectious and invasive) in pigs; planning of anti-epizootic and antiparasitic measures; diagnosis of infectious and parasitic diseases of various etiologies. Significant attention is paid to laboratory methods of research of biological material.

**Hygiene of pigs maintenance.** The discipline studies modern technologies of pig breeding; control of hygienic conditions for keeping and feeding pigs.

*Veterinary health support of sheep and goats*

**Veterinary preventive technologies of non-contagious diseases of sheep and goats.** The discipline studies preventive veterinary measures for the occurrence of pathology associated with metabolic disorders, hormonal disorders, vitamin and mineral nutrition in sheep and goats. Prevention of infertility and obstetric pathology in sheep and goats, as well as the use of modern methods of correcting their reproductive capacity. Prevention of impotence in sheep and goats. Prevention of surgical pathology and modern technologies in veterinary surgery.

**Veterinary preventive technologies of contagious diseases of sheep and goats.** Discipline studies modern technological schemes of diagnostic studies and prevention of infectious and invasive diseases of sheep and goats.

Vaccine prophylaxis of infectious diseases of sheep and goats, the use of serums, immunoglobulins, preparations possessing interferonogenesis. Prevention of helminthiasis, arachnoethomosis, diseases caused by the simplest.

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**Hygiene of sheep and goats maintenance.** Discipline studies modern systems of sheep and goats; control of hygienic conditions of retention and feeding; Features of maintenance and arrangement of stables in a dairy body; Hygiene of milk milking; Hygienic requirements for growing lambs and goats.

*Veterinary health support of exotic animals and fur animals*

**Veterinary preventive technologies of non-contagious diseases of exotic animals and fur animals.** Discipline studies preventive measures for the occurrence of pathology related to metabolic disorders, hormonal disorders, vitamin and mineral nutrition in exotic animals and fur animals. Prevention of obstetric, gynecological and andrological pathology, methods of hormonal regulation of sexual cycle in exotic animals and fur animals. Traumatology, dentistry, orthopedics, microsurgery. Prevention of surgical pathology.

**Veterinary preventive technologies of contagious diseases of exotic animals and fur animals.** The study of discipline ensures the acquisition of higher education of theoretical and practical knowledge of the diagnosis, treatment and prevention of contagious (infectious and invasive) diseases of exotic animals and fur animals, obtaining practical skills in conducting anti-epizootic and antiparasitic measures.

**Hygiene of exotic animals and fur animals maintenance.** Mastering the discipline will provide an opportunity to acquire knowledge in the hygiene of feeding and keeping exotic animals and fur animals.

*Veterinary health support of poultry*

**Veterinary preventive technologies of non-contagious diseases of poultry.** Discipline studies preventive measures for the emergence of pathology related to metabolic disorders, vitamin and mineral nutrition.

**Veterinary preventive technologies of contagious diseases of poultry.** The study of discipline provides acquisitions for higher education of theoretical and practical knowledge of diagnosis, treatment and prevention of contagious (infectious and invasive) poultry diseases, obtaining practical skills in conducting anti-epizootic and antiparasitic measures.

**Hygiene of poultry maintenance.** Discipline provides higher education benefits to theoretical and practical knowledge of modern hygiene and sanitation in poultry farming for the complex of veterinary and sanitary measures aimed at maintaining health, increasing the productivity of birds and receiving high-quality products safe to consume.

*Veterinary pharmacy*

**Pharmacy and pharmaceutical technology.** Pharmacy, discipline aimed at deepening theoretical knowledge, familiarization with normative-legislative documents regulating the development, production, sale and use of veterinary drugs, to obtain practical skills and prepare a graduate to independent work. The subject of discipline is a system of pharmaceutical support by veterinary medicines, in particular licensing conditions for pharmacies of economic activity, retail rules, regulations regulating state control and supervision of veterinary preparations and substances, rules for transportation and storage of veterinary drugs. Pharmaceutical technology - science of theoretical bases and production processes of processing of medicinal products in ready-made medicines, storage and leave. The tasks of discipline are the study of theoretical bases and practical issues of manufacturing of medicinal products in conditions of pharmacy and industrial production; Familiarity with equipment and equipment used in pharmacies and pharmaceutical enterprises; determining the correct type of packaging; Familiarity with the normative documentation in the production of finished medicines.

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**Clinical veterinary pharmacology and clinical pharmacy.** Clinical Pharmacology and Pharmacy - Integrated Applied Science, which combines the pharmaceutical and clinical aspects of medicine. The main task is to create theoretical bases and methodological approaches of rational use of medicines. In the course of studying the discipline, students will be acquainted with the basic principles of medical and veterinary deontology, the main types of normative documentation, mastering the main methods of laboratory and instrumental examination of patients, assimilation of general syndromology and clinical pathophysiology of the most common internal diseases of animals, assimilation of the general methodology and principles of choice of medicinal products for effective pharmacotherapy, studying clinical manifestations of side effects of medicinal products.

**Pre-clinical and clinical studies of medicinal products.** The purpose of pre-clinical research is to determine the toxic influence and therapeutic effectiveness of the future medicinal product, its influence on the basic systems of the organism, as well as the establishment of possible side effects on laboratory animals and test objects. Implementation of proper laboratory practice (GLP), which guarantees the quality of newly created medicines, their high therapeutic efficiency; GLP is a system of rules that encompass the organizational process and conditions for preclinical research are planned, their monitoring is provided, registration and storage of data is provided, a report on test results is provided. Clinical studies are carried out in order to detect or confirm clinical, pharmacodynamic effects of the investigated medicinal product or detecting all adverse reactions to it, as well as to study absorption, distribution, biotransformation and removal of the drug. Such studies should be carried out in accordance with the requirements of proper clinical practice (GCP), which are regulated by modern clinical trials.

#### *Veterinary laboratory diagnostics*

**Laboratory quality management.** The discipline studies state and international standards for the organization of chemical analytical laboratories, assessment of the suitability of methods, traceability and uncertainty of the results. The knowledge gained by specialists will allow a sufficient understanding of the laboratory system and reliably perform analytical measurement techniques.

**Clinical laboratory diagnostics.** The curriculum of the discipline provides: formation of theoretical knowledge and practical skills of master's students of the Faculty of Veterinary Medicine on various clinical and laboratory studies and comprehensive assessment of laboratory parameters of various biological material obtained from sick animals to determine the functional state of their bodies and laboratory diagnosis of various diseases. systems and organs. This discipline is based on knowledge of such training courses as biochemistry with the basics of physical and colloid chemistry, veterinary clinical biochemistry, clinical diagnostics, pharmacology, toxicology, animal nutrition and others. special disciplines. At the end of this discipline the master's student must know and be able to obtain various biological material from sick animals, have modern methods and techniques of laboratory research, give a correct interpretation of the results, predict possible complications and disease, be able to conduct preclinical studies of veterinary drugs in the laboratory animals in compliance with the requirements of good laboratory practice.

**Laboratory diagnosis of infectious diseases.** The purpose of studying the discipline is to increase practical skills in laboratory work, namely the features of sampling for research, their transportation, research and further interpretation.

**Pathomorphological diagnosis.** The discipline research the organization of histological laboratory, histopathological techniques, methods of histochemical and immunohistochemical diagnostics, as well as pays attention to practical skills of pathological autopsy, analysis of sections, selection of pathological material, construction

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of pathological and anatomical diagnosis and conclusion. Applicants for higher education study the diagnostic criteria and the main prognostic features of infectious and non-infectious diseases, which are most often registered in the practice of veterinary medicine. In particular, with pathomorphological diagnosis of animal tumors.

*Veterinary provision of public health*

**Laboratory analysis of food products.** The discipline studies the requirements of regulatory legal acts of Ukraine to ensure the quality of research in accredited laboratories. Applicants master the requirements for testing and calibration laboratories.

**Risk analysis of food and feed.** Discipline provides preparation for higher education for competent issues of analysis of microbiological risks in foods and feeds during their production, processing, storage, transportation and implementation. The applicants master the main approaches to the analysis of microbiological risks, a qualitative and quantitative risk assessment and are qualified to summarize the process of analyzing microbiological risks.

**Biosafety and biosecurity in veterinary medicine.** The discipline studies the basic requirements for biosafety and biosecurity in veterinary medicine, the principles and principles of the system in relation to the risks of occurrence and spread of infectious diseases. The role of international and public organizations in the creation and development of biosafety standards in veterinary laboratories and bio-industrial facilities is shown, as well as the need to create a State Biosafety Program to control animal infections and create effective protection.

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**Training of masters of sciences**  
**branch of knowledge "VETERINARY MEDICINE"**  
**in specialty 212 "VETERINARY HYGIENE, SANITARY AND EXPERTISE"**  
**in educational program "VETERINARY HYGIENE, SANITARY**  
**AND EXPERTISE"**

Form of training:	Licensed number of persons:
– full-time	75
Duration of training:	
– full-time educational and professional programs	6 years
Credits ECTS:	
– educational and professional programs	360
Language of teaching	Ukrainian
Qualification	doctor of veterinary medicine on safety and quality of agricultural and food products

**The concept of training**

Provides training of highly qualified specialists in the field of veterinary hygiene, sanitary and expertise; formulation of ability by veterinary and sanitary doctor to apply learning outcomes (knowledge, skills, experience) to control sanitation facilities at all stages of animals' breeding, rearing, exploitation, and the production, processing, transportation, inspection, storage and retail of food, feed, feed additives, premixes, reproductive material, veterinary pharmaceuticals, veterinary medication and by-products; apply legal monitoring, including safety and some quality indicators, maintaining good production practices and auditing of food safety management.

**Areas of employment for graduates**

According to the National Classifications of Occupations and obtained knowledge and skills veterinary and sanitary doctors may be employed as: Chief veterinarian (1237.1); veterinarian hygiene and sanitation doctor (CO code - 2223.2); doctor of veterinary medicine on safety and quality of agricultural products and food (CO code - 2223.2); veterinarian of meat processing plants (CO code - 2223.2) Head (deputy) of State Service of Ukraine on Food Safety and Consumers Protection territorial bodies (city, district) (1229.3), Chief State Control Inspector (1229.1); Chief State Auditor (1229.1); Research assistant (Veterinary Medicine) (2223.1); Researcher (Veterinary Medicine) (2223.1); Head of Laboratory (1229.4) and others in Ministries and Departments of Ukraine, the Structural units of Government, national and foreign companies and representative offices, businesses that operate in the field of veterinary hygiene, sanitary and examination; institutions of public and private veterinary services engaged in state and internal control of sanitary measures objects in conditions of farms (livestock facilities) during production, processing, transportation, storage and retail of food and feed; apply risk-based approach in all stages of production, processing, transport, acceptance, storage and retail of food, feed additives, premixes, strains of microorganisms, reproductive and pathological material, pharmaceutical and biological preparations, veterinary medicine remedies, animal-care products and by-products, to prevent pollution due to sanitation facilities, compliance with health and sanitary legislation, implementation of phytosanitary measures, handling pesticides, biological and agrochemical compounds, control organisms and state control on agricultural markets, commercial networks at the state border and transport, fishing and hunting areas.

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### Practical training

The main places of practical training of students is educational, scientific and industrial laboratories of University Basic Institution (Kiev), its Separated Subdivisions, Educational and Research Farms of the University ( "Velykosnytynske Education and Research Farm named after O. Muzychenka", "Agronomic Research Station", Education and Research Farm "Vorzel", Nemishaevo Agricultural College), where there are held laboratory and practical classes, educational practice and internship of students. In addition, the faculty has bilateral agreements with establishments of State Service of Ukraine on Food Safety and Consumers Protection, scientific and research institutions of Ukraine, laboratories of veterinary medicine, processing facilities (slaughter houses, milk-, meat-, poultry-, fish- processing enterprises).

### Curriculum of Master training in educational program "Veterinary hygiene, sanitary and expertise" (educational and professional program of Master's training)

Code n/a	Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work)	Amount of credits ECTS	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components EPP</b>			
CC 1.	Inorganic Chemistry	4	exam
CC 2.	Physics with the Basics Qualimetry	4	exam
CC 3.	Latin Language	4	test
CC 4.	Organic Chemistry	4	exam
CC 5.	Zoology	5	exam
CC 6.	History of Ukrainian nationhood	4	exam
CC 7.	Etnoculturology	4	test
CC 8.	Ukrainian Language for Professional Purposes	4	exam
CC 9.	Philosophy	4	exam
CC 10.	Foreign Language	5	exam
CC 11.	Physical Education		test
CC 12.	Agricultural policy	4	test
CC13.	Basics of Life Safety	4	test
CC 14.	Veterinary conflictology	4	test
CC15.	Personal legal culture	4	test
<b>Total</b>		<b>58</b>	
<b>Optional components EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1.	Optional subject 1	4	test
OCP 2.	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components EPP</b>			
<b>CC 16.</b>	Veterinary Deontology and ecological Sanitation	7	exam
<b>CC 17.</b>	Animal Genetics and Breeding	4	test
<b>CC 18</b>	Anatomy of animals	8	exam
<b>CC 19.</b>	Cytology, Histology, Embryology	7	exam
<b>CC 20</b>	Ecotrophology	5	test
<b>CC 21</b>	Biochemistry of Animals with the Fundamentals of Physical and Colloidal Chemistry	5	exam
<b>CC 22</b>	Animal Physiology	6	exam
<b>CC 23</b>	Animal Nutrition	5	test
<b>CC 24</b>	Veterinary Immunology	4	test
<b>CC 25.</b>	Veterinary and Sanitary Microbiology	5	exam
<b>CC 26.</b>	Veterinary and Sanitary Virology	6	exam

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits ECTS</b>	<b>The final control</b>
CC 27	Animal Hygiene	8	exam
CC 28	Veterinary Sanitary	6	exam
CC 29	Pathological Physiology	5	exam
CC 30	Animal Ethology and Welfare	5	exam
CC 31	Veterinary Clinical Diagnostic	6	exam
CC 32	Veterinary Pharmacology	4	exam
CC 33	Pathological Morphology	8	exam
CC 34	Parasitology and Invasive Diseases	7	exam
CC 35	Veterinary Radiology	4	exam
CC 36	Food Safety and Quality	9	exam
CC 37	Veterinary Obstetrics, Gynecology and Andrology	7	exam
CC 38	Veterinary Toxicology	8	exam
CC 39.	General and Special Surgery	7	exam
CC 40.	Food Hygiene	12	exam
CC 41.	Animal Internal Diseases	9	exam
CC 42.	Epizootology and Infectious Diseases	8	exam
CC 43.	Veterinary and Sanitary Inspection	6	exam
CC 44.	Commodity Science and Standardization	4	test
CC 45	Methods of Sanitary Investigation	5	test
CC 46	Veterinary policy	4	exam
CC 47	Production practice	14	exam
CC 48	The only state qualifying exam	4	exam
<b>Total</b>		<b>212</b>	
<b>Optional components EPP</b>			
<b><i>Free choice according to specialty</i></b>			
OC 1.	Hygiene of primary processing of animals	4	test
OC 2.	Food Laboratory Analysis	4	test
OC 3.	Veterinary Nutritional science	4	test
OC 4.	Hygiene of the Facilities Design	4	test
OC 5.	Forensic examination of food products	4	test
OC 6.	Hygiene of food processing enterprises	4	test
OC 7.	Veterinary administration	4	test
OC 8.	Game Hygiene	4	test
OC 9.	Food Safety	4	test
OC 10.	Biostatistics	4	test
OC 11.	Official Audit	4	test
OC 12.	Water Hygiene and Supply	4	test
OC 13.	State Control of Food products	14	exam
OC 14.	Veterinary business management	14	exam
OC 15.	International food regulation	14	exam
OC 16.	Food Risk Analysis	14	exam
OC 17.	Biosafety and Biosecurity in veterinary medicine	14	exam
OC 18.	International Standards of Animal Maintenance and Exploitation	14	exam
OC 19.	Animal By-Products Sanitary	12	exam
OC 20.	BAS Technology	12	exam
<b>Total</b>		<b>82</b>	
<b>The total amount of compulsory components</b>		<b>270</b>	
<b>The total amount of optional components</b>		<b>90</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>360</b>	

**Annotation of disciplines in the curriculum****GENERAL TRAINING CYCLE  
Compulsory components EPP**

**Inorganic Chemistry.** Classification of chemical elements and generated chemical compounds by respective groups, sub-groups and periods of the periodic system of Mendeleev; basic laws of chemical kinetics and chemical equilibrium; the current understanding of the structure of atoms and molecules; changing patterns of chemical activity of simple and complex matter in terms of the structure, nature and characteristics of chemical bonds; Nature of main types of chemical compounds solutions; the nature of oxidation processes; the essence of electrochemical processes and phenomena of metals corrosion; nature, structure, chemical properties of coordination (complex) compounds; methods of producing, distributing in nature, the use of human activity, in particular in the production, storage and processing of agricultural and food products, pharmaceutical and household compounds.

**Physics with the Basics Qualimetry.** The basic phenomena and laws of physics and biophysics, principles and mechanisms underlying the functioning of living organisms; modern physical and biophysical methods, measuring devices and equipment used in veterinary hygiene and sanitary.

**Latin Language.** The basic set of common terms and professional concepts in Latin, rules of grammar and style.

**Organic Chemistry.** The theoretical basis of organic chemistry and practical application of organic substances in the practice of veterinary hygiene and sanitary, peculiarities of chemical reactions involving organic compounds.

**Zoology.** Species composition, distribution, individual growth, body structure, reproduction, habits and distribution of protozoa, coelenterates, flat, round worms, mollusks, arthropods and chordates.

**History of Ukrainian nationhood.** The study of the objective laws of the development of the Ukrainian state. The adoption of the Constitution of Ukraine, analysis of common problems of Ukraine's transition to a social market economy and integration into the world community.

**Etnocultorology.** Ukrainian spiritual culture as part of world cultural process. The role of culture in shaping the personality and life of the Ukrainian people. Objective and subjective factors increase standards of culture at the present stage of Ukraine

**Ukrainian language (for professional purposes).** Scientific terminology, terms and their use, specific for veterinary specialty and restitution of previously acquired knowledge.

**Philosophy.** The system of philosophical knowledge of the main philosophy parts, developing the type of consciousness that is based on constructive and critical approaches to the ideals of humanism.

**Foreign Language.** The set of concepts and terms that make extensive language vocabulary, grammar rules and syntax.

**Physical Education.** Basics of maintaining a healthy lifestyle and the benefits of physical activity, perform basic elements of popular sports game, maintaining the level of physical skill and physical health.

**Agrarian policy.** The discipline introduces the principles of formation of policy in agrarian sphere, gives the possibility to gain proficiency in methodical and methodological principles of the development and realization of the complex of actions concerning support and provision of the development of agriculture in the system of inter-branch links in national economy as well as estimate from the theoretic position practical actions of state structures concerning regulation of the agricultural production of the country.

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Both national and foreign experience is studied. In case of mastering the material students get the possibility to form their own view on professional base about processes and phenomena happening in agrarian sector of the state economy.

**Basics of Life Safety.** Key rules of safety for the organization of production environment, its assessment for personal and collective security, monitoring of hazardous situations.

**Methodology and organization of scientific research on the basics of intellectual property.** The course examines main stages of Ukrainian science and higher education, their current state, especially degreeal reform of higher education with a focus on masters training, as well as candidates and doctors of sciences. Methods of research (historical, biological, zootechnical, veterinary, special) used in veterinary medicine, bioethics of doctor, conduct, researcher and scientist, selection of topic and forming tasks of research, invention and patent.

**Business foreign language.** Integrated learning of language professional activity. Types of language activity: reading, listening, speaking. Formation of dialogue and monologue speech skills preparation of students for professional communication in speech and writing in a foreign language. Study how to translate special texts as a way of presentation of adequate scientific information content. Formation of knowledge, necessary skills and abilities which ensure masters communicative ability in the field of professional communication: in particular, the ability to organize and hold a scientific conference in the specialty, to participate in the conference and make a scientific report, a business meeting or negotiations with foreign colleagues, partners.

**Personal legal culture.** One of the features of a legal state is the high level of legal culture of the citizens characterized by the common respect to the law, sufficient awareness of its norms and the ability to apply them in all life situations. The discipline «Legal culture of a personality» will permit students to develop legal thinking and cultural style of legitimate behavior in everyday life in interpersonal relations as well as in communication with representatives of court and law enforcing authorities.

## SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components EPP

**Veterinary Deontology and ecological Sanitation.** The main categories and concepts specialty "Veterinary hygiene, Sanitary and Expertise" system-position, its history, role in the functioning of the animal production and processing system, quality assurance and food safety, the State Veterinary Hygiene, Sanitation and Expertise in Ukraine and Inspection Service and State Veterinary and Sanitary Control in Ukraine and worldwide. Basic methods of environmental investigation; interrelationships between living organisms and the living and non-living components and processes in an environment; the influence of abiotic, biotic and anthropogenic factors on living organisms, the characteristics of ecosystems and livestock farms and complexes as artificial ecological systems and the principles of environmental management and prospects for the ecological balance of the environment, environmental and sanitary measures in the production of safe food of good quality.

**Animal Genetics and Breeding.** Cytological and molecular basis of heredity and variation, the essence of the chromosome theory of inheritance, the structure of genes and their functions, the essence of heredity genetic code, laws of inheritance, the essence of inbreeding and heterosis, genetic basis of individual animals, biological characteristics of different species, patterns of growth and development at different ages, the constitution and the exterior, interior, methods of breeding, selection, selection, assess the quality sires offspring, the impact of selection on the livelihoods and health, the effects of inbreeding and heterosis.

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**Anatomy of animals.** The structure and topography of the cardiovascular, digestion, respiration, excretion and reproduction system; characteristics of different species and sex; the structure of the central and peripheral; somatic and autonomic nervous system; structure and topography of the sense organs: sight, hearing and balance, smell, taste and touch, its relationship with the nervous system; structural features of the body and apparatus of the birds, support and movement apparatus, digestive, respiratory and urogenital, general skin and its derivatives.

**Cytology, Histology, Embryology.** Tissue preparation and light microscopy technics, basic histological structure and function of the eukaryotic cell, structure and function of epithelial, connective, muscle and nervous tissues microstructure and function of animals organs and apparatuses; structure and function of sex cells, histophysiology of fertilization, the early stages of embryogenesis of vertebrates, the differentiation of germ layers and development of axial organs

**Ecotrophology.** Food chain and interaction of food with the environment, society, economy, human health; approaches to solving the problems of human nutrition, impact of food on human health.

**Biochemistry of Animals with the Fundamentals of Physical and Colloidal Chemistry.** The chemical fundamentals of life organisms, including chemical structure and properties of natural compounds and their complexes, major pathways and mechanisms of regulation of metabolism, biochemical mechanisms of realization of genetic information; the latest achievements of biochemistry and prospects for their use in various sectors of the national economy, especially in veterinary hygiene and sanitary.

**Animal Physiology.** Principles of life processes (metabolism, respiration, circulation, digestion, etc.). at different structural levels; mechanisms of interaction between the individual systems and organs with the environment; qualitative differences in physiological functions in animals of different species, sex and age groups, peculiarities of physiological functions formation at different stages of individual development.

**Animal Nutrition.** Classification of feed and feed additives, nutritional value of its chemical composition, digestible nutrients and biologically active substances, productive action, exchange energy, principles of nutrition for various kinds and groups of industrial of animals. Methods of detection the chemical composition of the feed.

**Veterinary Immunology.** The principles and features of humoral and cellular immune factors, characteristic of nonspecific and specific factors of animals immunity.

**Veterinary and Sanitary Microbiology.** The morphological, physiological, biochemical and genetic characteristics of microorganisms; the impact of physical, chemical and biological factors to microorganisms; bacterial animal diseases; stages and methods of laboratory diagnostics of bacterial diseases, techniques bacteriological examination; identification of bacterial pathogens of animals; analysis of the results of bacteriological research.

**Veterinary and Sanitary Virology.** Viruses systematics and structure; methods of reproduction and cultivation of viruses; pathogenesis of viral diseases of animals; peculiarities of antiviral immunity, means and methods of diagnostics and prevention of viral diseases of animals.

**Animal Hygiene.** The theoretical basis of the mechanism of environmental factors influence on animals, rules and regulations of zoohygienic maintenance, feeding, breeding of animals of various species, sex, age and production groups, methods of the investigation of objects of the environment and ways of its correction.

**Veterinary Sanitary.** Means and methods of facilities sanitation, methods of monitoring its effectiveness, how to prevent the spread of infectious and parasitic diseases, the development strategy of safe, sanitary safe animal management.

**Pathological Physiology.** Basic common pathological processes in animals, their

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etiology, mechanisms of development and resolution; certain types of dysfunction of organs and body systems and mechanisms of its development; mechanisms of adaptation and compensation to damages and pathological processes of animals.

**Animal Ethology and Welfare.** The main forms of animals' behavioral responses, methods of control, methods and means of influence the behavior of animals of various species, gender and age in natural and artificial conditions, assessment and forecast the impact on animals of maintenance, transportation technologies, exploitation, feed and care.

**Veterinary Clinical Diagnostic.** Methods of animals' treatment; methods of clinical investigation of animals, including physical, instrumental and laboratory; plan and sequence of clinical animals' research; Methods of clinical examination of farm animals; Methods of fixing animals; professional ethics and deontology.

**Veterinary Pharmacology.** Terminology, chemical structure and composition of drug forms, its' physical and chemical properties, ways of absorption, distribution, biotransformation, excretion; mechanism of action at all levels, from the molecule to the cell to the organ to the whole animal, infectious agent; recommended prescriptions and limitations of use; therapeutic doses for different animal species; most rational drug forms; methods of writing prescriptions, toxicity and adverse negative effect; treatments for poisoning in case of overdose.

**Pathological Morphology.** Fundamentals of pathological processes (disorders of blood circulation and lymph flow, tissue fluid metabolism, degeneration, necrosis, atrophy, hypertrophy, hyperplasia, inflammation, tumors, immunopathological processes), pathology of various organs, nosology, pathomorphological changes and differential signs of major transmissible and non- transmissible diseases, identification and description of the nature of pathological processes in organs and tissues, its macro- and microscopic changes, provision of pathological-anatomical diagnosis, histological technics and its analyses.

**Parasitology and Invasive Diseases.** Parasitic diseases pathogens, their distribution, cycles of development, pathogenesis, symptoms, pathological changes in the body, diagnosis, treatment, prevention and recovery measures in the farms and territories.

**Veterinary Radiology.** Classification of ionizing radiation and its effect on the animals, feed, water and soil, food quality and safety, assessment of its impact on animals and food safety.

**Food Safety and Quality.** The criteria of food quality and safety. Ways and sources of harmful substances intake, mechanism of its destructive influences and means of resistance. Theoretical and methodological principles of food safety. Overview of selected quality and safety indicators.

**Veterinary Obstetrics, Gynecology and Andrology.** Morphological and physiological basis of animal reproduction, methods of semen analyses and evaluation, preservation and transportation of semen; specifics of the estrous cycle in farm and companion animals, the technique of artificial insemination of females; physiological characteristics and pathology of pregnancy, parturition and the post-partum period; obstetrical procedures and criteria for diagnosis, the basic principles of animal care during gestation and around parturition; disease, breast cancer, male genital diseases. disease of the newborn; characteristics of gynecological and andrological animals' examination.

**Veterinary Toxicology.** The main parameters of toxic substances measuring; Classification of pesticides by the function and toxicity parameters; physical and chemical properties of toxic substances and ways of their intake by animals and toxicokinetics; mechanism of toxic effects of toxic substances on animals; clinical signs and typical pathological and anatomical changes poisoned animals; rules of feed and pathological material sampling for chemical and toxicological studies; basic principles of diagnosis of

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animals poisoning; general and special treatment (antidote); rules of veterinary expertise in the case of animals' poisoning.

**General and Special Surgery.** Surgical diseases, their causes, methods of diagnosis, surgical and physician treatment, prevention of diseases, anesthesia, aseptic and antiseptic during surgery, rehabilitation of animals after surgery.

**Food Hygiene.** The system of sanitary measures and hygiene conditions designed to preserve quality, ensure safety and suitability of food, risk-based approach at all stages of production, processing, transportation, accepting, storage and retail of food of animal and plant origin, feed, feed additives, premixes, strains of microorganisms, reproductive and pathological material, pharmaceutical and biological drugs, veterinary drugs, animal-care products and by-products, to prevent pollution due to objects of sanitary measures, Compliance with health legislation, implementation of phytosanitary measures, handling pesticides and agrochemicals, control of biological organisms and the system of state control of the agricultural markets, commercial networks at the state border and transport, hunting and fishing areas.

**Animal Internal Diseases.** Methods of clinical, laboratory, functional, instrumental and other animals' investigation; peculiarities of etiology, pathogenesis, symptoms, and treatment guidelines and prevention of noncontagious diseases of domestic animals.

**Epizootology and Infectious Diseases.** Epizootic process and its driving force, the laws of epizootic process and stages epizootic, epizootic survey methodology of suspected or infected establishments. Principles for defining and establishing a zone or compartment, including protection and containment zones, methods of analysis of the epizootic situation of antiepzootic principles, epizootic forecasting, specific prevention of infectious animal diseases.

**Veterinary and Sanitary Inspection.** Fundamentals of veterinary and sanitary in Ukraine; legislation on veterinary sanitary; organizational structure of the inspection service in the country and abroad, planning of veterinary and sanitary measures and their control on facilities, transport, border, processing plants, markets, the calculation of expenditure on veterinary and sanitary measures, record keeping.

**Commodity Science and Standardization.** Physical, chemical and biochemical characteristics of products and its' changes at all stages of retail - from production to consumer. The objective and basic principles of state policy in the field of standardization. The role of standardization in food production.

**Methods of Sanitary Investigation.** Methods of sanitary investigation of animal facilities, processing enterprises, water, feed, soil; order for conduct, analysis and data processing requirements for scientific, industrial production investigation and record keeping.

**Veterinary policy.** Veterinary Policy discipline belongs to the cycle of specialized disciplines in the course of veterinary curriculum and considers the principles of the overview of the formulation and implementation of public policy at the local, national, regional and international levels through legislation, regulation and operational strategy. Veterinary policy concerns veterinary medicine issues such as animal and human health such as health inspections and certification, food safety, animal disease control, animal welfare and trade in animals and animal products. Particular attention is paid to legislation and organisational structure of national, European and the global community, e.g. OIE, Codex Alimentarius Commission.

### **Optional components EPP**

#### ***Free choice according to specialty***

**Hygiene of primary processing of animals.** Requirements for humane slaughter of animals by various methods. Hygienic requirements for stunning and exsanguination of

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slaughter animals. Evisceration of animal carcasses (skin removal, evisceration, splitting and carcass washing). Features of primary processing of pigs' and small ruminants' carcasses. Yield rates of slaughter products of farm animals. Slaughter and evisceration of carcasses of poultry, rabbits and nutria.

**Food Laboratory Analysis.** Requirements of current regulation of Ukraine, Codex Alimentarius and EU to ensure laboratory studies of food and feed, modern methods of sampling and investigation of food and assessment.

**Veterinary Nutritional science.** Types, methods of production, storage and purpose of application nutritive substances used as feed and feed additives in animal nutrition, mechanism of its action on the body, the quality and safety of products of animal, methods of control in food and animals, the consequences of their impact on animals and humans.

**Hygiene of the Facilities Design.** The structure of the existing rules of technological design of livestock enterprises and state building codes for industrial construction; the order of construction documents development; peculiarities of exploitation of buildings and facilities for livestock production; zoohygienic basic standards of construction of buildings.

**Forensic examination of food products.** Classification of sources veterinary law and their characteristics. Legislation on the safety and quality of food and the main tasks in this area.

**Hygiene of food processing enterprises.** Scientific principles behind hygiene of food processing enterprises. Hygienic requirements for the environment and supply systems of food processing enterprises. Laboratory control of the environment of food processing enterprises. Biosafety.

**Veterinary administration.** Record keeping and management of veterinary sanitation and hygiene. Preparation and execution of veterinary documents (veterinary certificates, protocols, certificates, draft decisions, orders, forms of veterinary accounting, reporting, etc.), their reproduction, reception and registration, control over implementation, as well as keeping documents in veterinary establishments and organizations.

**Game Hygiene.** Hygienic requirements for hunting and processing and recycling of game, state post-mortem control and inspection of game, assessment of hygiene requirements compliance within the game production.

**Food Safety.** Migration routes of harmful and foreign substances to the human body. Hazards characteristics, its classification and the impact to the human body, rating food hygiene by safety indexes.

**Biostatistics.** Organization of statistical study in veterinary medicine, principles of formation of statistical aggregate data for further analysis, the concept of statistical population and sample size, classification of data types, quantitative and qualitative data, general characteristics of statistical analysis methods, features of their use, statistical generalization; assessment of the reliability of results, the concept of null and alternative hypotheses, hypothesis testing.

**Official Audit.** HACCP principles, stages of constructing a system safety assurance; methods of procedures development, types of audits, especially the official (state) audit, improving the organizational structure of the competent authorities, good practices (GMP, GHP) control.

**Water Hygiene and Supply.** Classification of water sources, methods of disinfection and water quality, health and safety requirements for water supply, water quality control methods, regulations governing the operation of water sources and water quality and safety.

**State Control of Food products.** Requirements of current regulations regarding the principles and procedure of state control, risk analysis, associated with an object of sanitary measures, facilities and technology of processing; planning and application of

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state control of food and other objects of sanitary measures.

**Veterinary business management.** Veterinary services, business plan for veterinary establishments (veterinary clinics, veterinary diagnostic laboratories, veterinary pharmacies), licensing of veterinary practice. Registration of veterinary drugs, trademarks, advertising business in veterinary medicine.

**International food regulation.** International standards for food. Current standards and certification schemes for food producers. Development and implementation of control systems for food production.

**Food Risk Analysis.** Specificity and structure of risk analysis, the basic elements of risk management and measures of risk assessment and management, modeling risk; risk assessment and development of control (elimination) measures etc.

**Biosafety and Biosecurity in veterinary medicine.** The definition of "biosafety", "biosecurity", "biorisk" and "bioproducts management system" Important components of the control of bioproducts and biorisk management systems, including assessment and ensuring the proper functioning of the systems.

**International Standards of Animal Maintenance and Exploitation.** Legislation on animal health and welfare of livestock at farms, regulatory framework of the European Union and other countries to the maintenance, care, feeding, animal hygiene requirements for livestock buildings and facilities.

**Animal By-Products Sanitary.** General characteristics of the process of waste accumulation at livestock farms, physical and chemical properties and chemical composition of wastes at the different systems of feeding and keeping of farm animals and poultry; modern means and technological methods of removal, transportation of various cattle, pigs and poultry waste and its hygienic assessment; characteristics of recycling technology.

**BAS Technology.** Methods of production of biologically active substances used for the prevention of disease and the production of functional foods, its destination, mode of use, storage and sanitary control of safety and quality.

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**FACULTY OF FOOD TECHNOLOGIES  
AND QUALITY MANAGEMENT OF AGRICULTURAL PRODUCTS**

**Dean** – doctor of technical sciences, professor Larisa Vatslavivna Bal-Prylypko

Phone: (044) 527-89-50

E-mail: bplv@ukr.net

Location: academic building №12, room no.305-306

The faculty organizes and coordinates the educational process of preparing Masters in educational programs within the framework of specialties:

**Specialty 152 "Metrology and information and measurement technology"**

***Educational program "Quality, standardization and certification"***

The guarantor of the educational and professional program - Candidate of Technical Sciences, Associate Professor Yuliia Sliva

Graduate department:

**Standardization and certification of agricultural products**

Phone: (044) 527-82-78

E-mail: standardization@ukr.net

Head of the department – Candidate of Technical Sciences, Associate Professor Olga Priadko.

**Specialty 181 "Food technologies"**

***Educational program "Technologies of meat storage, canning and processing»***

The guarantor of the educational and professional program, doctor of technical sciences, professor Ihor Pavlovych Palamarchuk

Graduate department:

**Meat, fish and seafood technologies**

Phone: (044) 527-88-85

E-mail: slob2210@ukr.net

Head of the Department-candidate of Agricultural Sciences, Associate Professor Nataliia Slobodianiuk

***Educational program "Technologies of storage and processing of aquatic bioresources»***

The guarantor of the educational and professional program - Associate Professor Nataliia Slobodianiuk

Graduate department:

**Meat, fish and seafood technologies**

Phone: (044) 527-88-85

E-mail: slob2210@ukr.net

Head of the Department-Candidate of Agricultural Sciences, Associate Professor Nataliia Slobodianiuk

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***Educational program "Nutritionology"***

The Guarantor of the educational and professional program - Associate Professor  
Liudmyla Tyshchenko

Graduate department:

**Meat, fish and seafood technologies**

Phone: (044) 527-88-85

E-mail: slob2210@ukr.net

Head of the Department – Candidate of Agricultural Sciences, Associate Professor  
Nataliia Slobodianiuk

**Training of masters of sciences  
in branch of knowledge "Automation and instrument engineering"  
in specialty 152 "METROLOGY AND INFORMATION  
AND MEASUREMENT TECHNOLOGY"  
educational program "QUALITY, STANDARDIZATION AND CERTIFICATION"**

Form of Training:	Licensed number of people:
– Full-time	50
– Part-time	50
Duration of Training:	
– Full-time educational and professional program	1 years 4 months
– Part-time	1 years 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master's degree in quality, standardization and certification

### **Training concept**

A special feature of training specialists in quality, standardization and certification is that graduates of various training areas enter this program. Its special feature is its openness, multi-vector approach, flexibility and multi-variant approach. At the same time, there are significant differences in the list of selected disciplines of the curriculum of the program for bachelors with economic education, from the list of selected disciplines of programs for bachelors with technological, engineering or biological basic education.

The main tasks of the specialty are students' acquisition of knowledge about: the main components of the technical regulation system; the main legislative acts of Ukraine in the field of technical regulation; the main tasks, principles, scientific and practical approaches in the field of standardization, certification, metrology, quality; the influence of the technical regulation system on the efficiency of the economy; the fundamental regulatory documents in the field of standardization, certification, metrology, quality management international and european experience, the legislative regulatory framework in the field of technical regulation.

### **Areas of employment of graduates**

The Master's degree in the educational program "Quality, standardization and certification" allows graduates to hold a wide range of positions: quality specialist, quality engineer, employee of the quality management department, validation department, technical control department, metrological service, standardization and certification specialist, internal auditor, etc. Such education is also necessary for specialists engaged in standardization of new types of products, certification of products and services, maintenance of technical documentation, implementation of internal audits and self-inspections, validation of technological processes, certification of personnel, equipment and premises, etc.

### **Practical training**

During the internship, the foundations of practical activities, practical skills, skills and professional qualities of a future specialist in standardization, certification and quality management are laid.

The main bases of practice are: state enterprise "Ukrainian research and training center for standardization, certification and quality problems"; JSC "MZVKK" separate

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division "Myronivsky meat processing plant "LEHKO"; "Ukrainian quality association"; Bureau Veritas; LLC "TUF Ray land Ukraine"; Ukrainian Research Institute of Agricultural Radiology; Ukrainian Research Institute of forecasting and testing of agricultural production equipment and technologies named after Leonid Pogorilov; State Center for certification and expertise of agricultural products in Kyiv; PJSC "Zhashkivsky Creamery" Cherkasy region; SE "Malynske Forestry" Zhytomyr region; ALLC "Starinska poultry farm"; "Velikosnitynskiye educational and experimental farm named after O. Muzychenko" Kyiv region; Bilotserkovsky milk processing plant, Kyiv region; bakery complex No. 10, m Kyiv; LLC "Obolon", Kyiv; LLC "Rosinka", Kyiv; JSC "Farmak" Kyiv

### Proposed Topics of Master's qualification Thesis

1. Development of a program of inter-laboratory comparisons of soil testing for compliance with the requirements of ISO/IEC Guide 43-1:1997 at PJSC "Mironovsky khliboprodukt".
2. Development of a program for managing environmental aspects of production in the conditions of a processing enterprise at JSC "Farmak".
3. Implementation of a system for statistical control of processes in the laboratory of testing agricultural machinery
4. Research of consumer requirements regarding the quality of wood for furniture production.
5. Development of proposals for improving the monitoring system for the production of condensed milk in the conditions of PJSC "Bershad-Moloko".
6. Development of a standard for the technology of growing gladioli and justification of standardized indicators on the basis of the state enterprise "UkrNDSTS".
7. Development of a model for calculating optimal feeding rations for cattle.
8. Development of a standard for ostrich cultivation technology and justification of standardized indicators.
9. Development of elements of a system for monitoring the safety and quality of berry products grown in private farms .
10. Assessment of EU requirements for validation of food testing methods and development of recommendations for implementation in the practice of agricultural enterprises.

### Master's degree curriculum according to the educational program "Quality, standardization and certification" (educational and professional training program)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Legal support of management decisions	4	exam
CC 2	Business Foreign Language	4	exam
CC 3	Management psychology	4	exam
CC 4	Scientific communications in Master's research	4	exam
<b>Total</b>		<b>16</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1.	Optional subject 1	4	test
OCP 2.	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
<b>Compulsory components of EPP</b>			
CC 5.	Legislative metrology and standardization	5	exam
CC 6.	Quality management	6	exam, KP
CC 7.	Quality and safety management of agricultural and food products	6	exam
CC 8.	Information technologies and mathematical modeling of quality management systems	4	exam
CC 9.	Standardization and certification of agricultural products	5	exam, KP
CC 10.	Systematic approach and decision-making methods	4	exam
CC 11.	Research and innovation processes	4	exam
CC 12.	Audit and certification	4	exam
CC 13.	Economic aspects of entrepreneurial activity	4	exam
CC 14.	Practical training	4	
CC 15.	Preparation and defense of a master's qualification thesis	4	
<b>Total</b>		<b>50</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to speciality</b>			
OC 1	Personnel Management	4	exam
OC 2	International and regional standardization and certification	4	exam
OC 3	Methods of ensuring and managing food quality	4	exam, KP
OC 4	Philosophy of science and innovative development	4	exam
OC 5	Quality management of agricultural products and production	4	exam
OC 6	Environmental Management	4	exam
OC 7	Standardization and certification of products, production facilities and quality assurance systems	4	exam, KP
OC 8	Intellectual property	4	exam
OC 9	Higher school pedagogy	4	exam
OC 10	Agricultural policy	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of disciplines in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of EPP**

**Legal support of management decisions** The program provides for the study of a complex of modern legal knowledge, skills and abilities necessary for professional activities to ensure the powers of state bodies and provide public services to citizens. Help to better understand the essence and nature of public administration, study the legislation that regulates the activities of public administration bodies, as well as the practice of its application.

**Business Foreign Language** The overall goal of the Professional Foreign Language Teaching Program is to develop students' professional language competencies, which will contribute to their effective functioning in the cultural diversity of the educational and professional environment. It examines the methodology of searching for new information in foreign-language sources, linguistic methods of analytical processing of foreign-language sources. Research of printed foreign-language original literature and expansion of lexical and grammatical skills. Methods and linguistic features of annotating and abstracting foreign-language sources, as well as the basics of translating professionally-oriented foreign-language sources are studied.



**Management psychology** Theoretical and practical training of students on a deeper understanding of the conditions and factors, driving forces and determinants of personal development as a subject of management, the specifics of the motivational sphere of the manager, adaptive processes in the micro-society, types of managers, leadership styles.

**Scientific communications in Master's research** The process of studying the discipline provides for: familiarization with the digital landscape and tools for supporting scientific communications of researchers; improving the level of digital competencies; creating a personal educational environment and profiles for identifying the researcher in the scientometric space; reviewing the provisions, initiatives and source base related to open science and open access, copyright to electronic content, ethics of establishing electronic communications; gaining experience in managing research data, implementing scientific communication, presenting and distributing research results in digital format and evaluating them; developing the image of a scientist.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Legislative metrology and standardization** Standards of the organization (enterprises, institutions). Verification of the standard for compliance with the achieved level of development of science and technology in the relevant field of application of the standard. Determination of the achieved level of development of science and technology in the relevant field of application of the standard. Procedure for making changes to regulatory documents. Technical regulations. Legislation in the field of standardization. Procedure for revoking regulatory documents. Information about changes in regulatory documents. Unification of products and/or services. Standardization of products and/or services. State system of standardization. Standard control of technical documentation of an organization (enterprise, institution). Ways to provide the services of an organization (enterprise, institution) with the necessary documentation on standardization, quality management, and certification. Reports on the implementation of standards and the work of all services of the organization (enterprise, institution) on quality management and certification issues

**Quality management** Quality management systems for products and/or services. Structure of the organization (enterprise, institution). Standards of the DSTU ISO 9000 Quality Management System. Special functions of product and/or service quality management systems. Creating, implementing and managing quality systems. Documentation of product and/or service quality management systems. Technological documentation. Work plan for product and or service quality management. Determining the needs and requirements of consumers in products and/or services. Product quality management processes at the marketing stage. Assessment of the quality level of products and/or services. Determining the ability of an organization (enterprise, institution) to meet the quality indicators of products and/or services that are required. Preventive actions based on the results of internal inspections of the quality management system. Measurement, analysis, and improvement in the quality management system. Correcting actions for inconsistencies identified as a result of internal and external inspections of the quality management system.

**Quality and safety management of agricultural and food products** The program provides for the study of the requirements of the laws of Ukraine and regulatory documents on the quality and safety of agricultural products and food raw materials; the study of the maximum permissible levels of safety indicators according to national, European and international regulatory documents for various types of agricultural

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products, DSTU ISO 14000 standards for Environmental Protection in relation to processing and agricultural enterprises.

Mastering practical skills in developing quality and safety management systems for feed and agricultural products at all stages of its production in accordance with DSTU ISO 9000 and based on HACCP principles.

**Information technologies and mathematical modeling of quality management systems** The discipline is a course the knowledge of which allows students to understand the essence of using modeling results to select parameters for conducting technological processes and possible methods for calculating equipment in the industry technology, and to take a critical approach to choosing the organization of food production, the technological process of production. The study of this discipline gives future specialists the opportunity to scientifically and technically substantiate and manage technological processes in order to produce high-quality products, based on the position of system analysis.

**Standardization and certification of agricultural products** The program provides for the study of the principles of international standardization and national standardization of agricultural products, the requirements of the main international, European and national legislative, regulatory and regulatory documents in the field of standardization, certification of agricultural products, quality and safety assurance, indicators of safety and quality of agricultural products, familiarization with the practice of creating regulatory documents.

**Systematic approach and decision-making methods** The program provides for mastering the skills to identify system patterns, identify the main stages of problem solving, determine the system management technology that is rational based on achieving the goal of activity and using resources, and use the most well-known decision-making methods. Study of the principles of the system approach, technologies of typical control methods in systems, algorithm of the multi-criteria scale method.

**Research and innovation processes** Methods of scientific research. Methods of research on the formation of product quality (services provided). Types and potential of material resources (equipment, tooling, resources) to determine the conditions for forming the quality of products (services provided). Methods for determining the need for material resources (equipment, tooling, resources) to determine the conditions for forming the quality of products (services provided). Information flows shaping the quality of products (services provided). Collection and processing of information flows. Analysis and systematization of information. Process modeling. Causal relationships in the areas of quality, standardization, and certification. Forecasting the development of the production system. Analysis of the development of the production system. Analysis of staff motivation. Methods of scientific research. Collection and processing of information flows. Analysis and systematization of information.

**Audit and certification** Procedure for processing applications for certification of products and/or services, and/or quality systems. Certification objects of the certification scheme. Certification schemes. Rules for applying certification schemes. Rules for selecting certification schemes. Schemes for testing products and/or services, and/or quality systems. Certificates of conformity. National certification and accreditation systems of foreign countries. Self-assessment and internal audit of quality systems. External audit in the field of quality. Product certification in the UkrSEPRO system.

**Economic aspects of entrepreneurial activity.** The curriculum of the discipline provides for the study of theoretical concepts, as well as the acquisition and assimilation of practical skills in the ability to find specific ways and methods of making informed managerial decisions, conducting economic calculations, analytical and research work to identify internal reserves of production and economic activities of the enterprise.

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**Optional components of EPP*****Free choice according to specialty***

**Personnel management.** System of measurable indicators of employee qualifications. General principles of social division of labor in Ukraine. System of regulatory documents of the sphere of labor: social division of labor. Positioning of a specialist in the social division of labor. Corporate culture of an organization (enterprise, institution). Socio-economic state of society and forecast of its development. Modeling of professional activity (specialist model). Modeling of social activity (personality model). Classification of structural elements of professional activity.

**International and regional standardization and certification.** The program provides for the study of the principles of international standardization, accreditation and conformity assessment, requirements of the main international and European legislative, regulatory and regulatory documents in the field of standardization, certification and accreditation, environmental protection in the agro-industrial complex, ensuring the quality and safety of food products and the activities of international and regional organizations for standardization, accreditation and conformity assessment.

**Methods of ensuring and managing food quality** Organization of good hygiene, production and laboratory practice in the conditions of food production enterprises in accordance with certain international requirements for food quality and safety management, development and implementation of quality and safety management systems based on HACCP principles. Certification of food products and management systems applicable to food production.

**Philosophy of science and innovative development** Philosophical and scientific approaches to the study of science and innovation. Philosophy of science: ontological, gnoseological, epistemological dimension. Forms of organization of science. Classical, non-classical, and post-non-classical ideals of science. Methodology of cognition of scientific and innovative activities. Study of the main scientific forms. The importance of fundamental and applied research strategies. Philosophical foundations of the classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of the scientific picture of the world. Logic of scientific research in the context of global problems of our time (environmental, man-made and social). Axiological dimension of science: the problem of scientist responsibility.

**Quality management of agricultural products and production** The problems of quality management in the context of ensuring the competitiveness of agricultural products and services provided by enterprises are considered. The most important stages of development, the current state of the theory and practice of quality management are highlighted. The article examines the economic concepts of quality, principles and methods of its assessment, organizational and methodological principles of quality assurance and quality management of products and services. Special attention is paid to quality management systems based on ISO 9000 series standards, TQM concept, environmental management systems and occupational health and safety management.

**Environmental Management** Environmental Management in accordance with DSTU ISO 14000. Environmental management documentation in accordance with DSTU ISO 14000. Methods and techniques for quantifying the environmental and social consequences of incidents and accidents. Emergency situations. Documents on the prevention or level of damage to resources (human, material, informational, etc.) in an emergency. Regulations on investigation and accounting of accidents, occupational diseases and accidents at enterprises, institutions and organizations. Direct and indirect assessments of harm to people and the environment. Modeling of emergency scenarios. Immediate causes of an event, accident, or incident. Centralized and local public notification systems. Procedure for providing information in the field of protection of the

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population and territories. Basic measures to protect the population and territories in emergency situations. Personal protective equipment. Criteria and basic principles of evacuation measures. Evacuation bodies, their functions and tasks.

**Standardization and certification of products, production facilities and quality assurance systems** Mastering the scientific and theoretical foundations, methodological and organizational provisions of standardization and certification of agricultural products, production facilities and quality management.

**Intellectual property** The purpose of studying the discipline is an in-depth studying relations on the creation and circulation of intellectual property objects, a firm mastering of the legal mechanism of their regulation, obtaining the necessary skills to qualify the results of creative activity, and protecting the property and personal non-property rights of authors and owners both in Ukraine and abroad.

**Higher school pedagogy/** The main objectives of studying the discipline are: formation of students' knowledge about the theory of teaching and upbringing; formation of students' skills to identify and characterize pedagogical problems, selection of optimal pedagogical approaches for organizing training and upbringing.

**Agricultural policy** This discipline introduces future specialists to the basics of policy formation in the agricultural sector, provides an opportunity to master the methodological and methodological foundations of the development and implementation of a set of measures to support and ensure the development of agriculture in the system of intersectoral relations in the national economy, as well as to evaluate from the point of view of theory the practical actions of state structures to regulate the country's agro-industrial production.

Both domestic and foreign experience is studied. As a result of mastering the material, students get the opportunity to form their own opinion on the processes and phenomena occurring in the agricultural sector of the state economy on a professional basis.

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**Training of masters of sciences  
in branch of knowledge "Production and technologies"  
in specialty 181 "FOOD TECHNOLOGIES"  
educational program "TECHNOLOGIES OF STORAGE, PRESERVING  
AND REPROCESSING OF MEAT"**

Form of Training:	Licensed number of people:
– Full-time	30
– Part-time	30
Duration of Training:	
– Full-time educational and professional program	1 years 4 months
– Part-time	1 years 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master's degree in food technology

**Training concept**

For high-quality management of technological processes of storage, canning and processing of meat raw materials, it is necessary to expand networks of training and retraining of specialists in this area. Today, there is an increase in the efficiency of implementing new technologies. It is clear that successful practical implementation of the solution of important meat processing problems for Ukraine is possible through the training of specialists in process engineers in the educational program "Technology of meat storage, canning and processing" of the educational degree "Master".

Factors that determine the needs of training Masters in the educational program "Technologies of meat storage, canning and processing" are: the increase in the production of high-quality traditional and new food products, the introduction and development of new intensive technologies is possible only with the wide use of the results of fundamental scientific research in biotechnology, the implementation of modern technical and technological solutions is largely determined by the shortage of highly qualified personnel who could provide not only storage, canning and processing of meat according to existing technologies, but also significantly increase their technological level; the modern development of domestic and foreign industry is formed on the basis of biotechnical industry with an economically closed mode of production, which is an industry targeted transformation of raw materials of animal origin into specific food products with specific hardware design, control, management systems and the economy is impossible without training specialists of this profile.

**Areas of employment of graduates**

Scientific, educational, analytical, expert, advisory, management activities in the field of food technologies.

Graduates are able to perform professional work in various linear and functional divisions of organizations of all forms of ownership and organizational and legal forms, as well as educational, scientific, advice, consulting and design organizations and institutions; divisions of state and municipal administration in accordance with the national classifier of Ukraine "Classification of professions" SC 003:2010.

The main task of the program is to train process engineers in the technology of meat storage, canning and processing, able to work at meat processing enterprises, as well as at enterprises of related industries, organizations and firms to perform

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organizational and managerial, production, pedagogical, project and research work related to the research of new and improvement of existing technologies for the production of meat products and semi-finished products.

### Practical training

Practical training of students is an integral part of the educational process of training specialists in the master's degree of the educational program "Technologies of meat storage, canning and processing".

During the internship, the foundations of practical activities, practical skills, skills and professional qualities of a future specialist in the meat processing industry are laid.

During the period of study at the university, the future master's degree passes two industrial internships. All practices differ in their purpose, content, and duration.

Practice is conducted at advanced enterprises of the meat processing industry after studying fundamental, general engineering, socio – economic disciplines.

Students take internships at processing plants, regardless of their ownership forms. The choice of practice bases is made taking into account the specialization, technical and technological support of production and orders for training specialists.

The main bases of practice are – "Velikosnitinskiye educational and experimental farm named after O. Muzychenko" (slaughterhouse; educational, scientific and production laboratory of meat and meat products technology), SE "Marshalok", SE "Dryhalo" Kyiv region, Bila Tserkva; LLC «Globinsky meat processing plant» Poltava region, LLC "Cherkasy food company" Cherkasy region, CJSC "Koziatinsky meat processing plant", LLC "Gaisinsky meat processing plant" Vinnytsia region, LLC "Chernihiv meat processing plant".

### Proposed Topics of Master's qualification Thesis

1. Improvement of the technology of split semi-finished products in the test shell
2. Use of vegetable raw materials in the development of preventive products
3. Application of herbal medicinal raw materials in the technology of boiled sausages
4. Improvement of the technology of boiled sausages using flour from sprouted sea buckthorn seeds
5. Improvement of the technology of pickled meat semi-finished products using berry concentrates
6. Improvement of the technology of chopped semi-finished products using vegetables
7. Improving the technology of pates using goose liver

### Curriculum of Master training in educational program "Technologies of Storage, Preserving and Reprocessing of Meat" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Occupational safety in the field	4	exam
CC 2	Business Foreign Language	4	exam
CC 3	Management psychology	4	exam
CC 4	Scientific communications in Master's research	4	exam

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
<b>Total</b>		<b>16</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to the preferences of students from the list of disciplines</b></i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 5.	Modern methods of industry research	4	exam
CC 6.	Current problems of the industry	9	exam, KP
CC 7.	Technology of meat canning and storage	9	exam, KP
CC 8.	Biologically active substances from livestock raw materials	4	exam
CC 9.	Production processes optimization	4	exam
CC 10.	Food quality and safety management	4	exam
CC 11.	Production management	4	exam
CC 12.	Practical training	8	
CC 13.	Preparation and defense of a master's qualification thesis	4	
<b>Total</b>		<b>50</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to speciality</b></i>			
OC 1	Microstructural analysis of meat and meat products	4	exam
OC 2	Special technologies	4	exam
OC 3	Philosophy of science and innovative development	4	exam
OC 4	Global trends in the development of the food industry	4	exam
OC 5	Agricultural policy	4	exam
OC 6	Pet food technology	4	exam
OC 7	Nutritionology of healthy eating	4	exam
OC 8	International and regional standardization and certification	4	exam
OC 9	Modern technologies of food storage and canning	4	exam
OC 10	Intellectual property	4	exam
OC 11	Higher school pedagogy	4	exam
OC 12	Economic aspects of entrepreneurial activity	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OFF EPP</b>		<b>90</b>	

**Annotations of disciplines in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of EPP**

**Occupational safety in the field.** Methods and means of preserving and strengthening health, preventing diseases and ensuring professional legal capacity. Principles of selection of physical exercises, their layout and sequence of use for their intended purpose. Healthy lifestyle. Methods and means of developing professional significant psychophysical qualities. Methods of psychophysical training. Rules for preventing physical fatigue, overtraining, overexertion, and other crisis manifestations. Methods of self-monitoring the state of health, physical development and activity of functional systems of the body.

**Business Foreign Language.** The overall goal of the Professional Foreign Language Teaching Program is to develop students' professional language competencies, which will contribute to their effective functioning in the cultural diversity of the educational and professional environment. It examines the methodology of searching for new

information in foreign-language sources, linguistic methods of analytical processing of foreign-language sources. Research of printed foreign-language original literature and expansion of lexical and grammatical skills. Methods and linguistic features of annotating and abstracting foreign-language sources, as well as the basics of translating professionally-oriented foreign-language sources are studied.

**Management psychology.** Theoretical and practical training of students on a deeper understanding of the conditions and factors, driving forces and determinants of personal development as a subject of management, the specifics of the motivational sphere of the manager, adaptive processes in the micro-society, types of managers, leadership styles.

**Scientific communications in Master's research.** The process of studying the discipline provides for: familiarization with the digital landscape and tools for supporting scientific communications of researchers; improving the level of digital competencies; creating a personal educational environment and profiles for identifying the researcher in the scientometric space; reviewing the provisions, initiatives and source base related to open science and open access, copyright to electronic content, ethics of establishing electronic communications; gaining experience in managing research data, implementing scientific communication, presenting and distributing research results in digital format and evaluating them; developing the image of a scientist.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Modern methods of industry research.** The program provides for the study of the basic principles of research methodology in the food industry, modern classification of experiments, methods of selection, systematization and analysis of scientific information and research results, the procedure for registration of scientific paper and intellectual property rights.

**Current problems of the industry.** The program provides for the study of modern theoretical and practical foundations of current and resource-saving technologies for the production of new types of meat and combined products based on meat and increasing their shelf life.

**Technology of meat canning and storage.** The main task of studying the discipline is to deepen knowledge of technologies for canning meat and meat products, mastering technologies of the latest methods of canning and storage, technologies aimed at reducing weight loss and quality of raw materials and finished products, the formation of knowledge and practical skills to improve the main technological processes, a scientific approach to the choice of technologies for storing and preserving meat products.

**Biologically active substances from livestock raw materials.** During the study of the discipline, it is planned to provide future specialists with general information about the composition and basic properties of biological substances of various chemical nature that are part of animal raw materials, the use of these substances in the production of organic preparations. Students get acquainted with the characteristics of raw materials for the production of organic preparations, collection rules, primary processing, canning and transportation of endocrine-enzyme raw materials. They get acquainted with the technology of production of biologically active additives from animal raw materials.

**Production processes optimization.** The curriculum of the discipline provides for the study of theoretical and practical issues of optimization of typical technologies of the industry, aimed at identifying the best conditions for its implementation according to the chosen quality criterion during the study of the technological process itself. During the study of the discipline, it is planned to provide future specialists with knowledge on the basics of optimizing typical food production processes. As well as find out the most

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important optimization methods and use them to learn how to calculate the stages of technological processes, hardware design of production sites. Based on the calculated parameters of process management or the design of devices, you can select those of them from the operation of which one can get the maximum technological effect with the planned production volume.

**Food quality and safety management.** The program provides for the study of the requirements of the laws of Ukraine and regulatory documents on the quality and safety of agricultural products and food raw materials; the study of the maximum permissible levels of safety indicators according to national, European and international regulatory documents for various types of agricultural products, DSTU ISO 14000 standards for Environmental Protection in relation to processing and agricultural enterprises.

Mastering practical skills in developing quality and safety management systems for feed and agricultural products at all stages of its production in accordance with DSTU ISO 9000 and based on HACCP principles.

**Production management.** The subject of study of the discipline is the formation of students' competence regarding basic principles, main categories, modern concepts, theoretical provisions and practical methods of managing the main activity of enterprises and skills in developing a production strategy, creating and using industry-specific production subsystems as the basis for ensuring the organization's mission.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Microstructural analysis of meat and meat products.** Meat components. Microstructure of muscle tissue and features of the structure of its varieties: skeletal, cardiac and smooth. Structure of skeletal muscle.

**Special technologies.** Familiarization with innovations in agricultural production, study of methods of introducing innovative development at enterprises of the processing and food industry.

**Philosophy of science and innovative development.** Philosophical and scientific approaches to the study of science and innovation. Philosophy of science: ontological, gnoseological, epistemological dimension. Forms of organization of science. Classical, non-classical, and post-non-classical ideals of science. Methodology of cognition of scientific and innovative activities. Study of the main scientific forms. The importance of fundamental and applied research strategies. Philosophical foundations of the classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of the scientific picture of the world. Logic of scientific research in the context of global problems of our time (environmental, man-made and social). Axiological dimension of science: the problem of scientist responsibility.

**Global trends in the development of the food industry.** Acquisition of knowledge of the basics of industrial technologies of food products in the world, development of skills of independent analysis of technological processes of food production in modern industrial conditions of the world.

**Agricultural policy.** This discipline introduces future specialists to the basics of policy formation in the agricultural sector, provides an opportunity to master the methodological and methodological foundations of the development and implementation of a set of measures to support and ensure the development of agriculture in the system of intersectoral relations in the national economy, as well as to evaluate from the point of view of theory the practical actions of state structures to regulate the country's agro-industrial production.

Both domestic and foreign experience is studied. As a result of mastering the material, students get the opportunity to form their own opinion on the processes and

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phenomena occurring in the agricultural sector of the state economy on a professional basis.

**Pet food technology.** The program provides for the study of theoretical and practical issues of modern technologies of feed production and production of feed additives, the choice of optimal options for specific natural and economic conditions in order to increase production and improve the quality of feed and increase the efficiency of their use.

**Nutritionology of healthy eating.** Nutrition, food products, food substances and other components contained in products, their effects and interactions, norms of consumption, assimilation, loss and elimination from the body, their impact on various types of metabolism and their importance in maintaining health or causing diseases.

**International and regional standardization and certification.** At the present stage of development of society and its productive forces, standardization has become the most important means of improving production efficiency and improving product quality. Due to the need to increase demand for light industry products in Ukraine and abroad, increase its competitiveness, encourage the creation of new, non-traditional products with unique properties inherent only in vegetable raw materials, meet the requirements of consumers for the quality and reliability of products, taking into account the constant growth of commodity exchange between countries, standardization and certification of goods, industries and quality systems of light industry enterprises is becoming increasingly important.

**Modern technologies of food storage and canning.** The program provides for the study of the main provisions on the current state and prospects for the development of technologies for storing and canning food products; characteristics of the principles of canning: biosis, anabiosis, abiosis; methods of canning; characteristics of the main methods and methods of preserving the quality of raw materials and food products; characteristics of modern methods of freezing raw materials and food products; frozen semi-finished products and culinary products; sterilization, pasteurization of food products.

**Intellectual property.** The purpose of studying the discipline is an in-depth studying relations on the creation and circulation of intellectual property objects, a firm mastering of the legal mechanism of their regulation, obtaining the necessary skills to qualify the results of creative activity, and protecting the property and personal non-property rights of authors and owners both in Ukraine and abroad.

**Higher school pedagogy.** The main objectives of studying the discipline are: formation of students' knowledge about the theory of teaching and upbringing; formation of students' skills to identify and characterize pedagogical problems, selection of optimal pedagogical approaches for organizing training and upbringing.

**Economic aspects of entrepreneurial activity.** The curriculum of the discipline provides for the study of theoretical concepts, as well as the acquisition and assimilation of practical skills in the ability to find specific ways and methods of making informed managerial decisions, conducting economic calculations, analytical and research work to identify internal reserves of production and economic activities of the enterprise.

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**Training of masters of sciences  
in branch of knowledge "Production and technologies"  
in specialty 181 "FOOD TECHNOLOGIES"  
educational program "TECHNOLOGIES OF STORAGE AND REPROCESSING  
OF AQUATIC BIORESOURCES"**

Form of Training:	Licensed number of people:
– Full-time	30
Duration of Training:	
– Full-time educational and professional program	1 years 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master's degree in food technology

### **The concept of training**

In recent years, considerable attention in the processing industry has been paid to the processing of fish and seafood. The network of enterprises for this important area of food production from fish and non-fish seafood has been significantly expanded. Today, the efficiency of applying new technologies in the food industry is also increasing. It is clear that the successful solution of important tasks of fish processing enterprises for Ukraine is possible only by improving the training of specialists in process engineers in the educational program "Technology of aquatic bioresources storage and processing" of the Master educational degree.

The competence of a specialist of the Master educational degree in the educational program "Technologies of aquatic bioresources storage and processing" is determined by high professional potential and thorough training for activities not only in the conditions of functioning of modern agriculture, but also in the production sector in general.

### **Areas of employment of graduates**

Scientific, educational, analytical, expert, advisory, management activities in the field of food technologies.

Graduates are able to perform professional work in various linear and functional divisions of organizations of all forms of ownership and organizational and legal forms, as well as educational, scientific, advice, consulting and design organizations and institutions; divisions of state and municipal administration in accordance with the national classifier of Ukraine "Classification of professions" SC 003:2010.

The main task of the program is to train process engineers in the technology of storage, canning and processing of fish and seafood, able to work in research institutions dealing with the problems of fish and seafood processing technology, bodies of the Ministry of Agrarian Policy and food of Ukraine and the state agency of Fisheries of Ukraine, fish processing enterprises and vessels.

### **Practical training**

Practical training of students is an integral part of the educational process of training specialists in the master's degree of the educational program "Technologies of aquatic bioresources storage and processing".

During the internship, the foundations of practical activities, practical skills, skills and professional qualities of a future specialist in the fish processing industry are laid.

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During the period of study at the university, the future master's degree passes two industrial internships. All practices differ in their purpose, content, and duration.

Practice is conducted at advanced enterprises of the meat processing industry after studying fundamental, general engineering, socio – economic disciplines.

Students take internships at processing plants, regardless of their ownership forms. The choice of practice bases is made taking into account the specialization, technical and technological support of production and orders for training specialists.

The main bases of practice are: LLC "Fish Manufactory" Kyiv region, LLC "Alaska" Kyiv region, LLC "Rybkoпродукт" Kyiv region, LLC "Berdyansk fish processing plant", Zaporizhzhia region, JSC "Ochakovsky fish canning plant", Mykolaiv region, CJSC "Chernihiv enterprise for processing and selling fish products "Chernihivryba", Chernihiv region, LLC "Fish industrial technologies", Zhytomyr region and others.

### Proposed Topics of Master's qualification Thesis

1. Improvement of the technology of freshwater fish preserves and food additives.
2. Improvement of the technology of semi-finished products from hydrobionts using combined minced meat.
3. Improvement of the technology of culinary products based on freshwater fish roe.
4. Improvement of the technology of lightly salted fish products packed in modified media.
5. Improvement of the technology of pickled semi-finished products from sea fish.
6. Improvement of the technology of fish and vegetable products with the addition of kelp.
7. Justification and development of innovative technology for drying freshwater fish.

### Curriculum of Master training in educational program "Technologies of storage and reprocessing of aquatic bioresources" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Occupational safety in the field	4	exam
CC 2	Business Foreign Language	4	exam
CC 3	Management psychology	4	exam
CC 4	Scientific communications in Master's research	4	exam
<b>Total</b>		<b>16</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 5.	Modern methods of industry research	4	exam
CC 6.	Current problems of the industry	9	exam, KP
CC 7.	Modern technologies for fish products storing and canning	9	exam, KP
CC 8.	Technology of protein products from fish and seafood	4	exam
CC 9.	Production processes optimization	4	exam
CC 10.	Food quality and safety management	4	exam
CC 11.	Production management	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
CC 12.	Practical training	8	
CC 13.	Preparation and defense of a master's qualification thesis	4	
<b>Total</b>		<b>50</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to speciality</i>			
OC 1.	Microstructural analysis of fish and seafood	4	exam
OC 2.	International and regional standardization and certification	4	exam
OC 3.	Biologically active substances from fish and seafood	4	exam
OC 4.	Philosophy of science and innovative development	4	exam
OC 5.	Special technologies	4	exam
OC 6.	Global trends in the development of the food industry	4	exam
OC 7.	Modern technologies of food storage and canning	4	exam
OC 8.	Agricultural policy	4	exam
OC 9.	Nutritionology of healthy eating	4	exam
OC 10.	Intellectual property	4	exam
OC 11.	Higher school pedagogy	4	exam
OC 12.	Fish meal technology	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Occupational safety in the field.** Methods and means of preserving and strengthening health, preventing diseases and ensuring professional legal capacity. Principles of selection of physical exercises, their layout and sequence of use for their intended purpose. Healthy lifestyle. Methods and means of developing professional significant psychophysical qualities. Methods of psychophysical training. Rules for preventing physical fatigue, overtraining, overexertion, and other crisis manifestations. Methods of self-monitoring the state of health, physical development and activity of functional systems of the body.

**Business Foreign Language.** The overall goal of the Professional Foreign Language Teaching Program is to develop students' professional language competencies, which will contribute to their effective functioning in the cultural diversity of the educational and professional environment. It examines the methodology of searching for new information in foreign-language sources, linguistic methods of analytical processing of foreign-language sources. Research of printed foreign-language original literature and expansion of lexical and grammatical skills. Methods and linguistic features of annotating and abstracting foreign-language sources, as well as the basics of translating professionally-oriented foreign-language sources are studied.

**Management psychology.** Theoretical and practical training of students on a deeper understanding of the conditions and factors, driving forces and determinants of personal development as a subject of management, the specifics of the motivational sphere of the manager, adaptive processes in the micro-society, types of managers, leadership styles.

**Scientific communications in Master's research.** The process of studying the discipline provides for: familiarization with the digital landscape and tools for supporting scientific communications of researchers; improving the level of digital competencies; creating a personal educational environment and profiles for identifying the researcher in

the scientometric space; reviewing the provisions, initiatives and source base related to open science and open access, copyright to electronic content, ethics of establishing electronic communications; gaining experience in managing research data, implementing scientific communication, presenting and distributing research results in digital format and evaluating them; developing the image of a scientist.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of EPP**

**Modern methods of industry research.** The program provides for the study of the basic principles of research methodology in the food industry, modern classification of experiments, methods of selection, systematization and analysis of scientific information and research results, the procedure for registration of scientific paper and intellectual property rights.

**Current problems of the industry.** The program provides for the study of the main provisions on the current state and prospects of development of the raw material base of Ukraine in freshwater reservoirs and the World Ocean; characteristics of the main indicators of the quality of fish raw materials, products and methods of their determination; characteristics of the main methods and methods of preserving the quality of live, chilled, frozen, salted fish; smoking, drying and other methods of preserving fish and hydrobionts; fish semi-finished products and culinary products, etc.

**Modern technologies for fish products storing and canning.** The program provides for the study of the main provisions on the current state and prospects for the development of technologies for storing and canning fish and seafood; characteristics of the principles of canning: biosis, anabiosis, abiosis; methods of canning; characteristics of the main methods and methods of preserving the quality of live fish; methods of cooling fish and seafood; characteristics of modern methods of freezing fish and seafood; frozen semi-finished products and culinary products; sterilization, pasteurization of fish products.

**Technology of protein products from fish and seafood.** The program provides for the study of theoretical and practical issues of modern technologies for the production of protein masses, minced meat, concentrates, hydrolysates, molded, structured, emulsion and multicomponent products of regulated composition and structure, the choice of optimal options for specific natural and economic conditions in order to spread the range, increase production volumes and increase the efficiency of using raw materials.

**Production processes optimization.** The curriculum of the discipline provides for the study of theoretical and practical issues of optimization of typical technologies of the industry, aimed at identifying the best conditions for its implementation according to the chosen quality criterion during the study of the technological process itself. During the study of the discipline, it is planned to provide future specialists with knowledge on the basics of optimizing typical food production processes. As well as find out the most important optimization methods and use them to learn how to calculate the stages of technological processes, hardware design of production sites. Based on the calculated parameters of process management or the design of devices, you can select those of them from the operation of which one can get the maximum technological effect with the planned production volume.

**Food quality and safety management.** The program provides for the study of the requirements of the laws of Ukraine and regulatory documents on the quality and safety of agricultural products and food raw materials; the study of the maximum permissible levels of safety indicators according to national, European and international regulatory documents for various types of agricultural products, DSTU ISO 14000 standards for Environmental Protection in relation to processing and agricultural enterprises.

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Mastering practical skills in developing quality and safety management systems for feed and agricultural products at all stages of its production in accordance with DSTU ISO 9000 and based on HACCP principles.

**Production management.** The subject of study of the discipline is the formation of students' competence regarding basic principles, main categories, modern concepts, theoretical provisions and practical methods of managing the main activity of enterprises and skills in developing a production strategy, creating and using industry-specific production subsystems as the basis for ensuring the organization's mission.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Microstructural analysis of fish and seafood.** Students' knowledge of the basics of microstructural analysis of fish and seafood, which they need to assess their quality under various storage technologies.

**International and regional standardization and certification.** At the present stage of development of society and its productive forces, standardization has become the most important means of improving production efficiency and improving product quality. Due to the need to increase demand for light industry products in Ukraine and abroad, increase its competitiveness, encourage the creation of new, non-traditional products with unique properties inherent only in vegetable raw materials, meet the requirements of consumers for the quality and reliability of products, taking into account the constant growth of commodity exchange between countries, standardization and certification of goods, industries and quality systems of light industry enterprises is becoming increasingly important.

**Biologically active substances from fish and seafood.** The curriculum provides for the study of the characteristics of biologically active substances in the composition of various hydrobionts, theoretical foundations and technology for obtaining biologically active substances from fish and seafood, and general methods of their control.

International standardization and certification of technologies, raw materials and finished products – at the present stage of development of society and its productive forces, standardization has become the most important means of improving production efficiency and improving product quality. Due to the need to increase demand for light industry products in Ukraine and abroad, increase its competitiveness, encourage the creation of new, non-traditional products with unique properties inherent only in vegetable raw materials, meet the requirements of consumers for the quality and reliability of products, taking into account the constant growth of commodity exchange between countries, standardization and certification of goods, industries and quality systems of light industry enterprises is becoming increasingly important.

**Philosophy of science and innovative development.** Philosophical and scientific approaches to the study of science and innovation. Philosophy of science: ontological, gnoseological, epistemological dimension. Forms of organization of science. Classical, non-classical, and post-non-classical ideals of science. Methodology of cognition of scientific and innovative activities. Study of the main scientific forms. The importance of fundamental and applied research strategies. Philosophical foundations of the classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of the scientific picture of the world. Logic of scientific research in the context of global problems of our time (environmental, man-made and social). Axiological dimension of science: the problem of scientist responsibility.

**Special technologies.** Familiarization with innovations in agricultural production, study of methods of introducing innovative development at enterprises of the processing and food industry.

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**Global trends in the development of the food industry.** Acquisition of knowledge of the basics of industrial technologies of food products in the world, development of skills of independent analysis of technological processes of food production in modern industrial conditions of the world.

**Modern technologies of food storage and canning.** The program provides for the study of the main provisions on the current state and prospects for the development of technologies for storing and canning food products; characteristics of the principles of canning: biosis, anabiosis, abiosis; methods of canning; characteristics of the main methods and methods of preserving the quality of raw materials and food products; characteristics of modern methods of freezing raw materials and food products; frozen semi-finished products and culinary products; sterilization, pasteurization of food products.

**Agricultural policy.** This discipline introduces future specialists to the basics of policy formation in the agricultural sector, provides an opportunity to master the methodological and methodological foundations of the development and implementation of a set of measures to support and ensure the development of agriculture in the system of intersectoral relations in the national economy, as well as to evaluate from the point of view of theory the practical actions of state structures to regulate the country's agro-industrial production.

Both domestic and foreign experience is studied. As a result of mastering the material, students get the opportunity to form their own opinion on the processes and phenomena occurring in the agricultural sector of the state economy on a professional basis.

**Nutritionology of healthy eating.** Nutrition, food products, food substances and other components contained in products, their effects and interactions, norms of consumption, assimilation, loss and elimination from the body, their impact on various types of metabolism and their importance in maintaining health or causing diseases.

**Intellectual property.** The purpose of studying the discipline is an in-depth studying relations on the creation and circulation of intellectual property objects, a firm mastering of the legal mechanism of their regulation, obtaining the necessary skills to qualify the results of creative activity, and protecting the property and personal non-property rights of authors and owners both in Ukraine and abroad.

**Higher school pedagogy.** The main objectives of studying the discipline are: formation of students' knowledge about the theory of teaching and upbringing; formation of students' skills to identify and characterize pedagogical problems, selection of optimal pedagogical approaches for organizing training and upbringing.

**Fish meal technology.** The discipline provides for the study of methods and methods of manufacturing, storing, using and evaluating the quality of feed products from hydrobionts; the study of the current state of feed production in the world and domestic fishing industry, methods of production of fish meal, its energy and biological value, as well as changes that occur during production and storage.

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**Training of masters of sciences  
in branch of knowledge "Production and technologies"  
in specialty 181 "FOOD TECHNOLOGIES"  
educational program "NUTRITIONOLOGY"**

Form of Training:	Licensed number of people:
– Full-time ERP	15
Duration of Training:	
– Full-time educational and research program	1 years 10 months
Credits ECTS:	
– educational and research program	120
Language of Teaching	Ukrainian, English
Qualification	Master's degree in food technology

### **The concept of training**

The main task of a nutritionist is to select an effective, correct and balanced diet that will improve the overall health of a person and contribute to the treatment of diseases of the digestive system. The nutritionist should take into account the health status of each individual patient, constantly monitor changes in its body and make changes to the diet based on these data. In addition, the nutritionist is charged with the function of familiarizing the population with the main principles of healthy nutrition and teaching them to correctly use the acquired knowledge in everyday life.

Training high-level nutritionists is not an easy task, it requires not only qualified teachers, but also modern equipment, practical classes and the ability to conduct independent research.

In addition, the profession of a nutritionist requires responsibility, benevolence, sociability, and the ability to easily master new knowledge, methods, and methodological approaches from a specialist of this profile.

### **Areas of employment of graduates**

Graduates are able to perform professional work in various linear and functional divisions of organizations of all forms of ownership and organizational and legal forms, as well as educational, scientific, advice, consulting and design organizations and institutions; divisions of state and municipal administration in accordance with the national classifier of Ukraine "Classification of professions" SC 003:2010.

The specialist is prepared for professional activity in companies, small enterprises and institutes of the technological, social, medical sector and the health and labor sector (ensuring the quality of food safety systems, managing programs aimed at increasing people's well-being in the fields of Health, education, culture, sports, recreation, environmental protection, providing social services).

Training of young promising specialists who are ready to successfully start a career as: technologists with deep practical skills and theoretical knowledge in the field of preparation of health food and fitness products; experts for consulting groups who have practical experience with real projects in the field of healthy food industry, Wellness and SPA industry; nutritionists and healthy food consultants who know how to ensure a healthy lifestyle, prepare delicious healthy food and enjoy it.

### **Practical training**

Practical training of students is an integral part of the educational process of training specialists in the master's degree of the educational program "Nutritionology". Practical

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training involves working at leading enterprises, organizations, and institutions in Ukraine; long-term summer internships, trainings, and internships abroad.

### Proposed Topics of Master's qualification Thesis

1. Justification of complex family nutrition diets for the prevention of the most common diseases in Ukraine.
2. Development of a dietary nutrition system for children of Chaika children's health camp in Kyiv region.
3. Development of the sauce studio concept.
4. Scientific and practical justification of the development of the diet of athletes.
5. Scientific and practical bases of development of rations and technologies of semi-finished products for special purposes.
6. Scientific and technical foundations of rational catering for students in the NULES of Ukraine on the basis of the student canteen.
7. Scientific justification of military rations.
8. Scientific and practical justification of the technology of production of frozen culinary semi-finished products for health purposes.

### Curriculum of Master training in educational program "Nutritionology" (educational and research program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 1	Modern research methods	4	exam
CC 2	Management psychology	4	exam
CC 3	Food chemistry	6	exam
CC 4	Business Foreign Language	4	exam
CC 5	Philosophy of science and innovative development	4	exam
CC 6	Scientific communications in Master's research	4	
CC 7	Higher school pedagogy	4	
<b>Total</b>		<b>29</b>	
<b>Optional components of ERP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1.	Optional subject 1	4	test
OCP 2.	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 8	Food legislation and policy	4	exam
CC 9	Physiology and epigenetics of nutrition	6	exam
CC 10	Hygiene, toxicology and food safety	6	exam
CC 11	Nutritionology of healthy eating	6	exam, KP
CC 12	Nutrition of different categories of the population	6	exam
CC 13	Healthy eating technologies	6	exam, KP
CC 14	Production management	4	exam
CC 15	Agricultural policy	4	exam
CC 16	Practical training	12	exam
CC 17	Preparation and defense of a master's qualification thesis	5	
<b>Total</b>		<b>59</b>	
<b>Optional components of ERP</b>			
<b><i>Free choice according to speciality</i></b>			

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 1	Microbiota, probiotics, and prebiotics	4,0	exam
OC 2.	Ethics in dietetics	4,0	exam
OC 3.	Sports and preventive nutrition	4,0	exam
OC 4.	Food and dietary supplements	4,0	exam
OC 5.	Food quality and safety management	4,0	exam
OC 6.	Organization of scientific work preparation	4,0	exam
OC 7.	Health advertising	4,0	exam
OC 8.	Molecular technology of health products	4,0	exam
OC 9.	Technology of medical and preventive products	4,0	exam
OC 10.	Innovative technologies in nutrition	4,0	exam
OC 11.	Intellectual property	4,0	exam
OC 12.	International and regional standardization and certification	4,0	exam
<b>Total</b>		<b>24</b>	
<b>The total amount of compulsory components</b>		<b>88</b>	
<b>The total amount of optional components</b>		<b>32</b>	
<b>THE TOTAL AMOUNT OF ERP</b>		<b>120</b>	

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of ERP

**Modern methods of industry research** The program provides for the study of the basic principles of research methodology in the food industry, modern classification of experiments, methods of selection, systematization and analysis of scientific information and research results, the procedure for registration of scientific paper and intellectual property rights.

**Management psychology** Theoretical and practical training of students on a deeper understanding of the conditions and factors, driving forces and determinants of personal development as a subject of management, the specifics of the motivational sphere of the manager, adaptive processes in the micro-society, types of managers, leadership styles.

**Food chemistry** Chemical composition of food systems (raw materials, semi-finished products, finished products), its changes in the process of technological flow under the influence of various factors (physical and chemical) and general patterns of these transformations. It includes the study of the relationship between the structure and properties of food substances and its impact on the properties and nutritional value of food products.

**Business Foreign Language** The overall goal of the Professional Foreign Language Teaching Program is to develop students' professional language competencies, which will contribute to their effective functioning in the cultural diversity of the educational and professional environment. It examines the methodology of searching for new information in foreign-language sources, linguistic methods of analytical processing of foreign-language sources. Research of printed foreign-language original literature and expansion of lexical and grammatical skills. Methods and linguistic features of annotating and abstracting foreign-language sources, as well as the basics of translating professionally-oriented foreign-language sources are studied.

**Philosophy of science and innovative development** Philosophical and scientific approaches to the study of science and innovation. Philosophy of science: ontological, gnoseological, epistemological dimension. Forms of organization of science. Classical, non-classical, and post-non-classical ideals of science. Methodology of cognition of

scientific and innovative activities. Study of the main scientific forms. The importance of fundamental and applied research strategies. Philosophical foundations of the classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of the scientific picture of the world. Logic of scientific research in the context of global problems of our time (environmental, man-made and social). Axiological dimension of science: the problem of scientist responsibility.

**Scientific communications in Master's research** The process of studying the discipline provides for: familiarization with the digital landscape and tools for supporting scientific communications of researchers; improving the level of digital competencies; creating a personal educational environment and profiles for identifying the researcher in the scientometric space; reviewing the provisions, initiatives and source base related to open science and open access, copyright to electronic content, ethics of establishing electronic communications; gaining experience in managing research data, implementing scientific communication, presenting and distributing research results in digital format and evaluating them; developing the image of a scientist.

**Higher school pedagogy.** The main objectives of studying the discipline are: formation of students' knowledge about the theory of teaching and upbringing; formation of students' skills to identify and characterize pedagogical problems, selection of optimal pedagogical approaches for organizing training and upbringing.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of ERP**

**Food legislation and policy.** The main provisions of normative legal acts regulating healthy nutrition; the main provisions of the law of Ukraine "On the safety and quality of food products and food raw materials", the law of Ukraine "On milk and dairy products", "On fish, meat products and food products from them", "On withdrawal from circulation, processing, disposal, destruction or further use of low-quality and dangerous products", "On the protection of the population from infectious diseases", "On consumer rights protection". Legal basis for the activity of a nutritionist.

**Physiology and epigenetics of nutrition.** Formation of a holistic view of the regularities of functions and processes in the whole organism and its parts (systems, organs, tissues, cells), identification of the causes, mechanisms and patterns of vital activity of the body at various stages of ontogenesis and phylogenesis in interaction with the environment in the dynamics of life processes.

**Hygiene, toxicology and food safety.** Hygienic requirements for production and the environment, problems of human interaction with the environment; basic laws of hygiene science and general laws of health connection with factors and environmental conditions; environmental factors and their compliance with natural levels and hygiene standards; conducting toxicological and hygienic experiments, which students acquire in the course of performing laboratory work; conducting hygienic expertise of certain types of products and projects. Alimentary toxicology-theory and methodology of rationing of contaminants in food products; determination of alimentary risks of morbidity; features of rationing of chemical and radioactive substances in food and drinking water. Hygienic assessment and regulation of transgenic food.

**Nutritionology of healthy human nutrition.** Nutrition, food products, food substances and other components contained in products, their effects and interactions, norms of consumption, assimilation, loss and elimination from the body, their impact on various types of metabolism and their importance in maintaining health or causing diseases.

**Nutrition of different categories of the population** Hygienic principles of nutrition of certain groups of the population. nutrition of children of different age groups. Features of

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nutrition of persons of intellectual labor, employees of industrial enterprises, agricultural workers; nutrition of athletes, elderly and senile age; requirements for nutrition of pregnant and nursing mothers; non-traditional types of nutrition (vegetarian nutrition, nutrition of macrobiotics, nutrition in the system of yoga teaching, separate nutrition, raw food, fasting as a dietary method, nutrition by blood type, nutrition according to Ayurveda).

**Healthy eating technologies** Theoretical and practical knowledge of the ingredient composition of functional food products, their nutritional value and health-improving impact on the human body; new technologies for the production of health-improving food products, including for separately selected population groups. Types of biological action of food and types of nutrition. Axioms of human biological existence and principles of rational nutrition.

**Production management.** The subject of study of the discipline is the formation of students' competence regarding basic principles, main categories, modern concepts, theoretical provisions and practical methods of managing the main activity of enterprises and skills in developing a production strategy, creating and using industry-specific production subsystems as the basis for ensuring the organization's mission.

**Agricultural policy.** This discipline introduces future specialists to the basics of policy formation in the agricultural sector, provides an opportunity to master the methodological and methodological foundations of the development and implementation of a set of measures to support and ensure the development of agriculture in the system of intersectoral relations in the national economy, as well as to evaluate from the point of view of theory the practical actions of state structures to regulate the country's agro-industrial production.

Both domestic and foreign experience is studied. As a result of mastering the material, students get the opportunity to form their own opinion on the processes and phenomena occurring in the agricultural sector of the state economy on a professional basis.

### **Optional components of ERP**

#### ***Free choice according to specialty***

**Microbiota, probiotics, and prebiotics.** General terms on human microecology, composition and functions of microflora of various human biotopes; general concepts of normoflora preparations; basic requirements for probiotic microorganisms; basic technologies for manufacturing normoflora preparations and functional nutrition products based on probiotic microorganisms; requirements for normoflora preparations.

A modern view of the role of pro - and prebiotic drugs. Relevance of creating domestic multicomponent probiotic drugs. Microbial ecological system of humans. Physiological functions of normal microflora. List of probiotics and prebiotics registered in Ukraine. Classification of prebiotic components. Clinical use of probiotic drugs.

**Ethics in dietetics.** Organization of the nutrition system of a healthy and sick person at different age stages by applying modern scientific provisions of nutritionology and nutrition organization in medical and preventive, health-improving and educational institutions, as well as methods of prevention using a specially selected diet.

**Sports and preventive nutrition.** Theoretical and practical aspects of the impact of nutrition on the health of people of different groups; fundamentals of rational nutrition; theoretical and practical foundations of preventive nutrition; properties of individual groups of food products and their importance for health promotion. Ways to preserve and promote health through healthy, rational preventive and therapeutic nutrition.

**Food and dietary supplements.** Formation of necessary theoretical knowledge about food and dietary supplements, their classification, composition, role in food

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technologies and nutrition, assessment from the point of view of toxicology and medicobiological requirements.

**Food quality and safety management.** The program provides for the study of the requirements of the laws of Ukraine and regulatory documents on the quality and safety of agricultural products and food raw materials; the study of the maximum permissible levels of safety indicators according to national, European and international regulatory documents for various types of agricultural products, DSTU ISO 14000 standards for Environmental Protection in relation to processing and agricultural enterprises.

Mastering practical skills in developing quality and safety management systems for feed and agricultural products at all stages of its production in accordance with DSTU ISO 9000 and based on HACCP principles.

**Organization of scientific work preparation.** Providing students with knowledge on the classification of sciences, scientific and technical potential, organization of research activities in Ukraine, organizational bases of scientific research, basic scientific methodologies and methods, special research methods.

**Health advertising.** Effective formation of a healthy lifestyle, as well as preserving and strengthening one's own health by improving the living conditions of an individual based on rational nutrition.

**Molecular technology of health products.** The study of the role of individual biocomponents in the vital activity of the human body and the study of the features of technologies for obtaining new generation food products with pre-predicted properties, familiarizing students with new methods of processing natural functional raw materials as a source of necessary functional ingredients, the formation of theoretical and practical knowledge of students, as well as teach students from a scientifically based position to analyze and improve the technology of food production of a new generation in specific production conditions.

**Technology of medical and preventive products.** It covers the study of the following main objects: groups of functional components that make up food systems, their health-improving significance in the process of preventive and therapeutic nutrition; the main groups of health-improving food products and functional beverages.

**Innovative technologies in nutrition.** Formation of students' theoretical foundations and practical skills in food production based on innovative technologies used in the modern food industry and based on the results of scientific research in the industry.

**Intellectual property.** The purpose of studying the discipline is an in-depth studying relations on the creation and circulation of intellectual property objects, a firm mastering of the legal mechanism of their regulation, obtaining the necessary skills to qualify the results of creative activity, and protecting the property and personal non-property rights of authors and owners both in Ukraine and abroad.

**International and regional standardization and certification.** At the present stage of development of society and its productive forces, standardization has become the most important means of improving production efficiency and improving product quality. Due to the need to increase demand for light industry products in Ukraine and abroad, increase its competitiveness, encourage the creation of new, non-traditional products with unique properties inherent only in vegetable raw materials, meet the requirements of consumers for the quality and reliability of products, taking into account the constant growth of commodity exchange between countries, standardization and certification of goods, industries and quality systems of light industry enterprises is becoming increasingly important.

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## **FACULTY OF CONSTRUCTION AND DESIGN**

**Dean** – Ph.D. (Technical Sciences), associate professor Zynoviy Ruzhylo

Tel.: +38 (044) 527-81-29

E-mail: design\_dean@nubip.edu.ua

Location: building № 11, room 305

The faculty organizes and coordinates the educational process of preparation of masters for educational programs in the specialty:

### **Specialty 133 «Mechanical engineering»**

#### ***Educational program "Machinery and equipment of agricultural production"***

Guarantor of the educational-professional program - Doctor of Technical Sciences, Prof. Yuriy Oleksandrovych Romasevych

Guarantor of the educational-research program - Doctor of Technical Sciences, Prof. Vyacheslav Sergeevich Loveikin

Diploma Departments:

#### **Constructing of Machines and equipment**

Тел.: (044) 527-87-34

E-mail: machinebuild\_centre@twin.nauu.kiev.ua

Head of department – Doctor of Technical Sciences, professor Vyacheslav Loveykin

#### **Reliability of machinery**

Tel.: +38 (044) 527-87-71

E-mail: novitskiyAV@ukr.net

Head of department – Ph.D. (Technical Sciences), associate professor Andriy Novitskiy

#### **Tractors, cars and bio energy systems**

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E-mail: vvchuba@ukr.net

Head of department – Candidate of Technical Sciences, Associate Professor Chuba Vyacheslav Vladimirovich

#### ***Educational program "Forest Complex Equipment"***

Guarantor of educational and professional program - Ph.D. (Technical Sciences), associate Professor Titova Lyudmila Leonidivna

Diploma Departments:

#### **Constructing of Machines and equipment**

Тел.: (044) 527-87-34

E-mail: machinebuild\_centre@twin.nauu.kiev.ua

Head of department – Doctor of Technical Sciences, professor Vyacheslav Loveykin

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Head of department – Ph.D. (Technical Sciences), associate professor Andriy Novitskiy

***Educational program "Technical service of machines and equipment of agro-industrial complex"***

Guarantor of the educational and professional program - Ph.D. (Technical Sciences), associate Professor Andriy Valentynovych Novytsky

Diploma Departments:

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Head of department – Doctor of Technical Sciences, professor Vyacheslav Loveykin

**Specialty 192 "Industrial and Civil Engineering"**

***Educational program "Construction and civil engineering"***

Guarantor of the educational-professional program - Ph.D. (Technical Sciences), associate professor Bakulin Evgeniy Anatoliyovych

Guarantor of the educational-research program - Doctor of Technical Sciences, Professor Ihor Anatoliyovych Yakovenko

Diploma Departments:

**Construction**

Tel.: +38 (044) 527-83-92

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Head of department – Ph.D. (Technical Sciences), associate professor Evgeniy Bakulin

**Mechanics**

Tel.: +38 (044) 527-83-25

Email: bulgakov@nubip.edu.ua

The head of the department is Doctor of Technical Sciences, Professor Volodymyr Mykhailovych Bulgakov

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**Training of masters of sciences  
in branch of knowledge "Mechanical engineering"  
in specialty 133 "MECHANICAL ENGINEERING"  
educational program "MACHINERY AND EQUIPMENT  
OF AGRICULTURAL PRODUCTION"**

Type of studying:	Licensed persons::
– full-time studying	50
– part-time studying	50
Duration of studying:	
- full-time educational-professional program	1 years 4 months
- full-time educational-research program	1 years 10 months
– part-time program	1 years 4 months
Credits:	
– educational-professional program	90
– educational-research program	120
Language	Ukrainian, English
Academic degree	Master of Mechanical Engineering

**Concept of training**

Training of masters in specialty 133 "Mechanical engineering", the educational program "Machinery and equipment of agricultural production" is based on the systematic approach of mastering special skills and knowledge sufficient for the fulfillment of professional tasks and responsibilities of an innovative nature in the field of construction, design, testing, certification, maintenance and utilization of machinery and equipment for agricultural production.

The specialist gets deep knowledge of the design, engineering and testing of agricultural machinery based on the theory of technical systems, a clear understanding of the stages of system evaluation and testing methods of agricultural machines in accordance with sectoral, national and international standards. The engineering of machines is realized through formation, structuring and solution of optimization problems of analysis and synthesis of agricultural machines.

**Educational-professional program of master's training**

The specialist gets deep knowledge of the design, engineering and testing of agricultural machinery based on the theory of technical systems, a clear understanding of the stages of system evaluation and testing methods of agricultural machines in accordance with sectoral, national and international standards. The engineering of machines is realized through formation, structuring and solution of optimization problems of analysis and synthesis of agricultural machines.

**Areas of employment of graduates**

Graduates with the qualification «engineer-designer» are able to perform professional tasks and responsibilities of an innovative nature, provided in the form of economic activity, primary positions in the group of professions: organizational and managerial activities, pedagogical and research work, in the design and research departments of enterprises, research and design institutions.

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### **Educational-research program of master's training**

The specialist gets deep knowledge about the innovative construction and design of mechatronic systems of agricultural machinery based on the classical and modern concepts of mechatronics, the control of the mechanical motion of equipment with programmable support and the theory of digital control.

There is a clear understanding of the stages of the design of hydromechanical and electromechanical systems, the application of elements of technical aesthetics and industrial design for the creation of modern agricultural machinery production.

### **Areas of employment of graduates**

Graduates with the qualification «engineer-designer» are able to perform professional tasks and responsibilities of an innovative nature, provided in the form of economic activity, primary positions in the group of professions: organizational and managerial activities, pedagogical and research work, in the design and research departments of enterprises, research and design institutions.

### **Practical training**

During practical training, the faculty focuses on close interaction and cooperation with the university's research facilities, as well as scientific institutions of the state, such as: VB NUBiP of Ukraine "Velosnatynyna Educational Research Farm. O.V. Mozychenko, V.P. NUBiP of Ukraine "Agronomical Research Station", VN NUBiP of Ukraine "Educational research farm" Vorzel ", VB NUBiP of Ukraine" Boyarsky Forest Research Station". Practical training of students is also carried out at advanced scientific institutions and modern enterprises of agricultural profile, such as: National Science Center "Institute of Mechanization and Electrification of Agriculture", Ukrainian Research Institute of Forecasting and Testing of Machinery and Technologies for Agriculture the production of the name of Leonid Pogorilly, TAN, BelotserkovMAZ, Chervona Zirka, Claas, John Deere, Amako, Astra, Irpinmash.

### **Proposed Topics of Master's qualification Thesis**

1. Adjustment to constructional and technological parameters of the biogas reactors of the rotary type.
  2. Investigation to efficiency of nutrition for plants cultivated in greenhouses by the use of mediator adapter.
  3. Adjustment to constructional and technological parameters of the belt conveyor to move vegetable seeds.
  4. Improving of potato harvesting machine with designing of separating device.
  5. Investigation to the process and the rationale structural parameters in order to improve machine for the fuel pellets produce.
  6. Adjustment to parameters and operating modes for milking machine of pair-wise type at the maternity section for 25 animals.
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**Curriculum of Master training  
in educational program "Machinery and equipment of agricultural production"  
(educational and professional program of master's training)**

Code	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Number of credits	Form of final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Fundamentals of scientific research	4	exam
<b>Optional components of EPP</b>			
<i><b>Free choice according to the preferences of students from the list of disciplines</b></i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 2	Mechanics of structures of technical systems	5	exam
CC 3	Systems of automated designing	6	exam, KP
CC 4	Reliability of technical systems	3	exam
CC 5	Energy-ecological valuation of machines design	5	test, exam
CC 6	Theory of technical systems	5	exam, KP
CC 7	Methods of construction of working bodies of agriculture techniques	5	exam
CC 8	Mechatronics	6	test, exam
CC 9	Reliability of technical systems	5	exam, KP
CC 10	Internship	6	test
CC 11	Research practice	10	test
CC 12	Preparation and defense of master's qualification thesis	6	
<b>Optional components of EPP</b>			
<i><b>Free choice according to speciality</b></i>			
OC 1.1	Design of vibration machines	4	exam
OC 1.2	Vibration processes in agroculture technology		
OC 2.1	Design of machinery and equipment in animal husbandry	4	exam
OC 2.2	Human-animal-machine system		
OC 3.1	Designing of machines and equipment in bioenergy	4	exam
OC 3.2	Technological processes in bioenergy		
OC 4.1	Economics of technological systems	4	exam
OC 4.2	Economics of innovation in mechanical engineering		
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Curriculum of Master training  
in educational program "Machinery and equipment of agricultural production"  
(educational and research program of master's training)**

Code	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Number of credits	Form of final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 1	Fundamentals of scientific research	4	exam
CC 2	Theory and methods of scientific research	4	exam
<b>Optional components of ERP</b>			
<i><b>Free choice according to the preferences of students from the list of disciplines</b></i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code</b>	<b>Components of the educational program (academic disciplines, course projects (works), practices, qualification work)</b>	<b>Number of credits</b>	<b>Form of final control</b>
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 3	Mechanics of structures of technical systems	5	exam
CC 4	Systems of automated designing	5	exam, KP
CC 5	Reliability of technical systems	3	exam
CC 6	Energy-ecological valuation of machines design	5	test, exam
CC 7	Theory of technical systems	5	exam, KP
CC 8	Dynamics and optimization of machines	3	exam
CC 9	Economics of technological systems	4	exam, KP
CC 10	Methods of construction of working bodies of agriculture techniques	4	exam
CC 11	Mechatronics	5	test, exam
CC 12	Reliability of technical systems	5	exam, KP
CC 13	Theoretical and experimental methods of modeling machine units	3	exam
CC 14	Technical support of biotechnical process	3	exam
CC 15.	Industrial nanomaterials and nanotechnology in technique	3	exam
CC 16	Internship	6	test
CC 17	Research practice	15	test
CC 18	Preparation and defense of master's qualification thesis	6	
<b>Optional components of ERP</b>			
<b>Free choice according to speciality</b>			
OC 1.1	Design of vibration machines	4	exam
OC 1.2	Vibration processes in agroculture technology		
OC 2.1	Design of machinery and equipment in animal husbandry	4	exam
OC 2.2	Technological processes in animal husbandry		
OC 3.1	Designing of machines and equipment in bioenergy	4	exam
OC 3.2	Technological processes in bioenergy		
OC 4.1	The theory of mechatronic systems of agricultural machines	4	exam
OC 4.2	Robotics in mechanical engineering		
OC 4.3	Automation of mechanical engineering processes		
OC 5.1	Biomechanics	4	exam
OC 5.2	3d printing		
OC 6.1	Economics of technological systems	4	exam
OC 6.2	Economics of innovation in mechanical engineering		
<b>The total amount of compulsory components</b>		<b>88</b>	
<b>The total amount of optional components</b>		<b>32</b>	
<b>THE TOTAL AMOUNT OF ERP</b>		<b>120</b>	

**Annotation of disciplines of the curriculum**

**Compulsory components**

**Fundamentals of scientific research.** The discipline studies the general provisions of scientific activity, in particular the concept of method and methodology and their role in scientific knowledge, stages of research, the organization of the experiment, the basics of inventive work, including the application for invention, experimental data.

**Theory and methods of scientific research.** Improving the general theoretical and practical engineering level of future masters of construction by mastering the basics of theoretical knowledge and practical skills on the general concept of experimental research methods.

**Mechanics of structures of technical systems.** The discipline studies the phenomena that affect the working capacity of technical systems, considers the construction and technological methods of improving the design of machines, in terms of energy intensity, metal volumes, etc .; provides the theoretical substantiation of the necessary accuracy of elements of structures of technical systems and offers methods of its provision..

**Systems of automated designing.** The discipline involves raising the general theoretical and practical professional level of future engineers of designers by familiarizing them with modern systems of automated designing of different classes, mastering of functional capabilities and methods of use, mastering the necessary techniques and practical skills of performing design work using the main systems of automated designing.

**Reliability of technical systems.** It is a complex discipline, which studies: the concept of technical systems and their classification; schemes of reliability of technical systems and their analysis; method of optimizing the number of backup system elements; the theory of graphs; logic-simulation model for reliability testing of technical systems; methods of ensuring the reliability of agricultural machinery, as technical systems.

**Energy-ecological valuation of machines design.** In this discipline are studied methods and methodics for calculating and designing of the development of technical means at all stages, schemes of construction and functioning of objects of modern new technology for agriculture.

**Theory of technical systems.** The discipline aimed to study the main provisions of the systematic examination of the goals of technical systems of machines and equipment for agricultural production and familiarization with the constructive solution methods. In this case, any technical system is viewed as a process of interaction of its elements in space and time.

**Dynamics and optimization of machines.** The course is aimed at studying the dynamic models of specific machines, their mathematical description, calculation of current dynamic loads and recommendations for their reduction during operation.

**Economics of technical systems.** The economic aspects of making design decisions in order to obtain maximum benefit are studied. Classroom and practical classes in the discipline provide students with mastery of the economic foundations of production in the conditions of agro-industrial enterprises.

**Methods of designing working bodies of agriculture machines.** The course in this discipline is aimed at studying the existing methods of designing working bodies of agricultural machinery, mastering the functionality and schemes of their use, mastering the necessary techniques and practical skills to perform work using methods of designing the production of agricultural machinery.

**Mechatronics** The course in this discipline is aimed at familiarizing with the main provisions and directions of the use of mechatronics, which examines the structures of the machine with computer control and the functions of devices and software for their handling.

**Reliability of agricultural techniques.** This is a complex discipline that studies the patterns of changes in the technical condition of machines and their elements during operation, studies the implementation of methods and ways to eliminate defects and damage, reveals ways to give surfaces the necessary physical and mechanical properties by: surfacing, spraying, application of polymers, electroplating, plastic deformation, electrical methods of processing and thus restoring the efficiency of agricultural machinery.

**Theoretical and experimental methods of modeling machine units.** It is a complex discipline that studies the methods and techniques of modeling objects that interact with each other and the environment in order to predict the object's response to

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control influences, analyze its sensitivity to various factors while maintaining the mathematical description of the physical adequacy of a real object.

**Technical support of biotechnological processes.** Mastering the discipline involves: studying the methods, rules and regulations used during biotechnological production; mastering the basic requirements for the use of products of biotechnological industries; obtaining in-depth knowledge of the principles and processes of work, technological adjustment of the main parameters of bioprocesses that are necessary for their highly efficient use in agro-industrial production; consideration of specific aspects of designing technical equipment of biotechnological processes; study and development of equipment design methodologies taking into account the biological requirements of operation and manufacture.

**Industrial nanomaterials and nanotechnologies in engineering.** Provides students with theoretical knowledge and practical skills in the science of methods of obtaining nutrients and methods of their physical and chemical analysis, study of their structure and properties of technology, efficiency, study of structural, physicochemical and toxicological aspects of safety of materials and processes of nanoindustry, and technical and technological support of nanoproduction production.

### **Optional components** *Free choice according to speciality*

#### **Educational and professional program of master's training**

*(Choice of 4 disciplines in one of the sub-blocks)*

**Design of vibration machines.** The discipline studies the basics of methods of analytical description and calculation of fluctuations and motion of mechanical systems and general design principles of vibrating machines, in particular, the main types of calculations of their parameters and generation tools of mechanical vibrations and pulses and structural features of machinery vibration of agriculture.

**Vibration processes.** The discipline studies the basics of methods of analytical description and calculation of oscillations and motion of mechanical systems and general principles of vibration processes, in particular, the main types of calculations of their parameters, as well as means of generating mechanical oscillations and pulses.

**Design of machinery and equipment in animal husbandry.** This discipline allows you to learn the methods of development and design work items, machinery, equipment, production of mechanized production lines in livestock, systematization and consolidation of knowledge on technology, mechanization, environment, and safety of animal products.

**Human-animal-machine system.** The study of the discipline is aimed at acquiring comprehensive knowledge and skills that will allow to make reasonable and appropriate management and engineering and technological decisions in the field of efficient management of organic raw materials and waste, in particular, for processing organic waste (raw materials) livestock, crop and other industries. communal, etc.) for high-quality organic fertilizers.

**Designing of machines and equipment in bioenergy.** The course includes the fundamentals of designing machines and equipment for bioenergy production in agroindustrial complex, and peculiarities of their choice of rational constructive-technological parameters of optimization of technological processes of bioenergy.

**Technological processes in bioenergy.** The training course studies the basics of the technological processes of bioenergy production in agriculture, optimization of technological processes of bioenergy.

**The theory of mechatronic systems in agricultural machines.** The course in this discipline is aimed at getting acquainted with the basic provisions and directions of the use

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of mechatronics, which studies the structure of a computer-controlled machine and the functions and structures of devices and software for their control.

**Economics of technological systems.** The economic aspects of making design decisions in order to obtain maximum benefit are studied. Classroom and practical classes in the discipline provide students with mastery of the economic foundations of production in the conditions of agro-industrial enterprises.

**Economics of innovation.** The economic aspects of making design decisions in order to obtain maximum benefit are studied. Classes in the discipline provide students with mastery of the economic foundations of innovative industries in agro-industrial enterprises.

### **Educational and research program of master's training**

*(to choose from 6 disciplines in one of the sub-blocks)*

**Design of vibration machines.** The discipline studies the basics of methods of analytical description and calculation of fluctuations and motion of mechanical systems and general design principles of vibrating machines, in particular, the main types of calculations of their parameters and generation tools of mechanical vibrations and pulses and structural features of machinery vibration of agriculture.

**Vibration processes.** The discipline studies the basics of methods of analytical description and calculation of oscillations and motion of mechanical systems and general principles of vibration processes, in particular, the main types of calculations of their parameters, as well as means of generating mechanical oscillations and pulses.

**Design of machinery and equipment in animal husbandry.** This discipline allows you to learn the methods of development and design work items, machinery, equipment, production of mechanized production lines in livestock, systematization and consolidation of knowledge on technology, mechanization, environment, and safety of animal products

**Human-animal-machine system.** The study of the discipline is aimed at acquiring comprehensive knowledge and skills that will allow to make reasonable and appropriate management and engineering and technological decisions in the field of efficient management of organic raw materials and waste, in particular, for processing organic waste (raw materials) livestock, crop and other industries. communal, etc.) for high-quality organic fertilizers.

**Designing of machines and equipment in bioenergy.** The course includes the fundamentals of designing machines and equipment for bioenergy production in agroindustrial complex, and peculiarities of their choice of rational constructive-technological parameters of optimization of technological processes of bioenergy.

**Technological processes in bioenergy.** The training course studies the basics of the technological processes of bioenergy production in agriculture, optimization of technological processes of bioenergy.

**The theory of mechatronic systems in agricultural machines.** The course in this discipline is aimed at getting acquainted with the basic provisions and directions of the use of mechatronics, which studies the structure of a computer-controlled machine and the functions and structures of devices and software for their control.

**Robotics in mechanical engineering.** The course in this discipline is aimed at getting acquainted with the basic provisions and directions of the use of robotic systems, which studies the structure of the machine with artificial intelligence and the functions and structure of devices and software for their control.

**Automation of mechanical engineering processes.** The study of the discipline is aimed at getting acquainted with the basic provisions and areas of use of automated systems, which studies the structure of the machine with automated control.

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**Biomechanics.** The course in this discipline is aimed at getting acquainted with the basic provisions and directions of using biomechanics as a prototype of the structure of a machine unit.

**3d printing.** The course in this discipline is aimed at getting acquainted with the main provisions and areas of use of modern three-dimensional printing technologies, software development and the use of 3D printers.

**Economics of technological systems.** The economic aspects of making design decisions in order to obtain maximum benefit are studied. Classroom and practical classes in the discipline provide students with mastery of the economic foundations of production in the conditions of agro-industrial enterprises.

**Economics of innovation.** The economic aspects of making design decisions in order to obtain maximum benefit are studied. Classes in the discipline provide students with mastery of the economic foundations of innovative industries in agro-industrial enterprises.

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**Training of masters of sciences  
in branch of knowledge "Mechanical Engineering"  
in specialty 133 "MECHANICAL ENGINEERING"  
educational program "FOREST COMPLEX EQUIPMENT"**

Type of studying:	Licensed persons:
– full-time studying	50
Duration of studying:	
- full-time educational-professional program	1 years 4 months
Credits:	
– educational-professional program	90
Language	Ukrainian, English
Academic degree	Master of Mechanical Engineering

**Concept of training**

The training of masters in specialty 133 "Sectoral engineering" of the educational program "Forestry equipment" is based on the systematic approach of mastering special skills and knowledge that are sufficient for the fulfillment of professional tasks and responsibilities of innovative character in the field of construction, design, testing, certification, maintenance and utilization of machinery and equipment of the forest complex.

The specialist gets deep knowledge of the design, engineering and testing of forestry equipment based on the theory of technical systems, a clear understanding of the stages of system evaluation and testing methods of forestry equipment in accordance with sectoral, national and international standards.

There is a clear understanding of the design of the forest complex equipment - as a complex mechanical system. An assessment of the quality of repaired and non-repaired systems is carried out, and their reliability is ensured.

**Educational-professional program of master's training**

The specialist gets deep knowledge of the design, engineering and testing of forestry equipment based on the theory of technical systems, a clear understanding of the stages of system evaluation and testing methods of forestry equipment in accordance with sectoral, national and international standards.

There is a clear understanding of the design of the forest complex equipment - as a complex mechanical system. An assessment of the quality of repaired and non-repaired systems is carried out, and their reliability is ensured.

**Areas of employment of graduates**

Graduates with the qualification «engineer mechanic» are able to perform professional tasks and responsibilities of an innovative nature, provided in the form of economic activity, primary positions in the group of professions: organizational and managerial activities, pedagogical and research work, in the design and research departments of enterprises, research and design institutions.

**Practical training**

During practical training, the faculty focuses on close interaction and cooperation with the university's research facilities, as well as scientific institutions of the state, such as: VB NUBiP of Ukraine "Velosnatynyna Educational Research Farm. O.V. Mozychenko", VB NUBiP of Ukraine "Agronomic Experimental Station", VN NUBiP of Ukraine

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Educational Research Farm "Vorzel", VB NUBiP of Ukraine "Boyarsky Forest Research Station". Practical training of students is also carried out at advanced scientific institutions and modern enterprises of rural and such as: the National Science Center "Institute of Mechanization and Electrification of Agriculture", the Ukrainian Research Institute for predicting and testing equipment and technologies for agriculture Arsenal Production named after Leonid Pogorilly, TAN, John Deere, Amako, Astra, State Forestry Agency of Ukraine.

### Proposed Topics of Master's qualification Thesis

1. Justification of the structural parameters of the chipper of wood materials.
2. Investigation of the drying process of wood raw materials and justification of the parameters of the dryer.
3. Justification of the parameters of the hydraulic booster mechanism for cutting wood.
4. Optimization of the rotation mode of a stationary jib crane for timber transportation.
5. Investigation of technical condition and development of technological process of repair of wood shredder.

### Curriculum of Master training in educational program "Forest complex equipment" (educational-professional training program)

Code	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Number of credits	Form of final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Fundamentals of scientific research	4	exam
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 2	Dynamics of machines for forestry	5	exam
CC 3	Computer design of equipment for forestry	5	exam, KP
CC 4	Energy ecological assessment of construction of equipment for forestry	5	exam
CC 5	Mechatronic systems of machines for forestry	8	test, exam
CC 6	Theory and designing of machines for forestry	4	exam, KP
CC 7	Reliability of machines for forestry	7	exam
CC 8	Methods of designing the working bodies of machines for forestry	6	test, exam
CC 9	Internship	6	exam, KP
CC 10	Research practice	10	test
CC 11	Preparation and defense of master's qualification thesis	6	test
<b>Optional components of EPP</b>			
<b><i>Free choice according to speciality</i></b>			
OC 1.1	Designing of technical systems for forestry (of vibration action)	4	exam
OC 1.2	Vibration processes in machines for forestry		
OC 2.1	Designing of technical systems for forestry	4	exam
OC 2.2	Technological processes in machines for forestry		
OC 3.1	Reliability of technical systems in machines for forestry	4	exam

Code	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Number of credits	Form of final control
OC 3.2	Reliability of technological systems in machines for forestry		
OC 4.1	Economics of technological systems	4	exam
OC 4.2	Economics innovation in machines for forestry		
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotation of disciplines of the curriculum

#### Compulsory components of EPP

**Fundamentals of scientific research.** The discipline studies the general provisions of scientific activity, in particular the concept of method and methodology and their role in scientific knowledge, stages of research, the organization of the experiment, the basics of inventive work, including the application for invention, experimental data.

**Dynamics of machines for forestry.** Discipline is directed on studying the dynamic models of concrete machines and equipment for forest complex; its mathematical descriptions; calculation of dynamic.

**Computer design of equipment for forestry.** Discipline involves the raise of comprehensive theoretical and practical professional skills by familiarizing students with CAD-programs of various classes, learning its functional possibilities and methods of use, adoption of techniques and skills that are necessary for designing of machines for forestry.

**Energy ecological assessment of construction of machines for forestry.** In this discipline the methods and techniques of calculation and design at all stages of development of technical means, schemes of construction and functioning of objects of modern new equipment of machines for forestry are studied.

**Reliability of machines for forestry.** This is a complex discipline that studies: patterns of changes in the technical state of machines and their details during functioning; methods and techniques to remove defects and damages; giving to the surface of details the required physical and mechanical characteristics; recovery technological processes for typical parts of equipment used for forestry and wood processing.

**Mechatronic systems of machines for forestry.** Course of this discipline provides principles of constructing and common functioning algorithm for mechatronic systems used in forestry; its calculations, design and characteristics put into practice

**Theory and designing of machines for forestry.** This discipline studies the methods and techniques of calculation and designing at all stages of projecting; schemes, structure, and functions of machines and equipment for forestry.

**Reliability of machines for forestry.** This is a complex discipline that studies: patterns of changes in the technical state of machines and their details during functioning; methods and techniques to remove defects and damages; giving to the surface of details the required physical and mechanical characteristics; recovery technological processes for typical parts of equipment used for forestry and wood processing

**Dynamics of machines for forestry.** Discipline is directed on studying the dynamic models of concrete machines and equipment for forest complex; its mathematical descriptions; calculation of dynamic.

**Methods of designing the working bodies of machines for forestry.** The course on this discipline is aimed at understanding the existing basics of designing the work equipment of the forestry equipment complex, assimilating the functional capabilities and schemes of their use, mastering the necessary techniques and practical skills in the



implementation of work using the methods of designing the production purpose of forestry engineering.

**Optional components of EPP**

***Free choice according to speciality***

*(Choice of 4 disciplines in one of the sub-blocks)*

**Designing of technical systems for forestry (of vibration action).** The discipline studies the principles and methods of analytical description and calculation of oscillations and motion of mechanical systems, general principles of design of vibration machines, calculations of their basic parameters, means of generating mechanical oscillations and pulses, as well as design features of vibration machines in forestry.

**Vibration processes in machines for forestry.** The course studies the basics of methods of analytical description and calculation of oscillations and motion of mechanical systems of machines for forestry and general principles of vibration processes, in particular, the main types of calculations of their parameters, as well as means of generating mechanical oscillations and pulses.

**Designing of technical systems for forestry.** Courses in this discipline aims to explore the theoretical approaches and principles of optimization timber production and logging works; the basis to calculate the productivity and technological coordination of the work to the single machines and the whole production lines; the rational plan-schemes and methods to design and optimize the technological processes of the timber storage and sawmill enterprises.

**Technological processes of machines for forestry.** The training course studies the basics of passing the technological processes of machines for forestry, and their optimization.

**Reliability of technical systems in machines for forestry.** The discipline is complex, which studies: the concept of technical systems and their classification; reliability schemes of technical systems and their analysis; method of optimizing the number of spare elements of systems; graph theory; apparatus of logical-simulation modeling for research of reliability of technical systems; methods of ensuring the reliability of technical equipment systems of the forest complex.

**Reliability of technological systems in machines for forestry.** The course in this discipline is aimed at studying engineering methods of testing technological systems of forest equipment, which allow to obtain an objective assessment of structural, technological and operational properties of equipment and determine their compliance with technical tasks and current technological requirements for work processes.

**Economics of technological systems.** The economic aspects of making design decisions in order to obtain maximum benefit are studied. Classroom and practical classes in the discipline provide students with mastery of the economic foundations of production in the conditions of agro-industrial enterprises.

**Innovation Economics in machines for forestry.** The economic aspects of making design decisions in order to obtain maximum benefit are studied. Classes in the discipline provide students with mastery of the economic foundations of innovative industries in the forest complex.

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**Training of masters of sciences  
in branch of knowledge "Mechanical Engineering"  
in specialty 133 "MECHANICAL ENGINEERING"  
educational program "TECHNICAL SERVICE OF MACHINES AND EQUIPMENT  
OF AGRICULTURAL PRODUCTION"**

Type of studying:	Licensed persons:
– full-time studying	50
Duration of studying:	
- full-time educational-professional program	1 years 4 months
Credits:	
– educational-professional program	90
Language	Ukrainian, English, German
Academic degree	Master of Mechanical Engineering

### **Concept of training**

The training of masters in specialty 133 "Sectoral engineering" of the educational program "Technical service of machines and equipment of agroindustrial complex" is based on the systematic approach of mastering special skills and knowledge sufficient for the fulfillment of professional tasks and responsibilities of innovative character in the field of construction, design, testing, certification, maintenance and utilization of machinery and equipment.

The specialist gets deep knowledge of design, engineering and testing techniques based on the theory of technical systems, a clear understanding of the stages of system evaluation and test methods in accordance with sectoral, national and international standards.

A clear understanding of the technical service of machinery and equipment of agro-industrial complex is foreseen. An assessment of the quality of repaired and nonrepaired systems is carried out, and their reliability is ensured.

### **Educational-professional program of master's training**

The specialist gets deep knowledge of design, engineering and testing techniques based on the theory of technical systems, a clear understanding of the stages of system evaluation and test methods in accordance with sectoral, national and international standards.

A clear understanding of the technical service of machinery and equipment of agro-industrial complex is foreseen. An assessment of the quality of repaired and nonrepaired systems is carried out, and their reliability is ensured.

### **Areas of employment of graduates**

Graduates with the qualification «engineer mechanic» are able to perform professional tasks and responsibilities of an innovative nature, provided in the form of economic activity, primary positions in the group of professions: organizational and managerial activities, pedagogical and research work, in the design and research departments of enterprises, research and design institutions.

### **Practical training**

During practical training, the faculty focuses on close interaction and cooperation with the university's research facilities, as well as scientific institutions of the state, such as: VB NUBiP of Ukraine "Velosnatynyna Educational Research Farm. O.V. Mozychenko",

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VB NUBiP of Ukraine" Agronomic Experimental Station ", VN NUBiP of Ukraine" Educational Research Farm "Vorzel", VB NUBiP of Ukraine "Boyarsky Forest Research Station". Practical training of students is also carried out at advanced scientific institutions and modern enterprises of rural and such as: the National Science Center "Institute of Mechanization and Electrification of Agriculture", the Ukrainian Research Institute for predicting and testing equipment and technologies for agriculture Arsenal Production named after Leonid Pogorilly, TAN, John Deere, Amako, Astra, State Forestry Agency of Ukraine.

### Proposed Topics of Master's qualification Thesis

1. Justification of the structural parameters of the unit of agricultural machinery.
2. Investigation of the process and substantiation of parameters of the feed mill.
3. Justification of the parameters of the hydro-boosting mechanism.
4. Optimization of the rotation mode of a stationary jib crane for timber transportation.
5. Investigation of the technical condition and development of the technological process of repairs of this technology.

### Curriculum of Master training in educational program "Technical service of machinery and equipment of agricultural production" (educational-professional training program)

Code	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Number of credits	Form of final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Fundamentals of scientific research	4	exam
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 2	Mechanics of constructions of technical systems of technical service	5	exam
CC 3	Automated design systems	6	exam, KP
CC 4	Energy ecological assessment of construction of machines	5	exam
CC 5	Management and logistics of service enterprises	7	test, exam
CC 6	Qualimetry	4	exam, KP
CC 7	Reliability of equipment of technical service	8	exam
CC 8	Methods of designing of equipment for technical service	5	test, exam
CC 9	Internship	6	exam, KP
CC 10	Research practice	10	test
CC 11	Preparation and defense of master's qualification thesis	6	test
<b>Optional components of EPP</b>			
<b><i>Free choice according to speciality</i></b>			
OC 1.1	Planning of technical service companies	4	exam
OC 1.2	Technological systems of repair production		
OC 2.1	Design of technological processes of technical service	4	exam
OC 2.2	Rationing of operations of technical service		
OC 3.1	Reliability of technical systems of technical service	4	exam
OC 3.2	Reliability of technological systems of technical service		

Code	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Number of credits	Form of final control
OC 4.1	Economics of technological systems	4	exam
OC 4.2	Economics of innovation in machinery		
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotation of disciplines of the curriculum

#### Compulsory components of EPP

**Fundamentals of scientific research.** The discipline studies the general provisions of scientific activity, in particular the concept of method and methodology and their role in scientific knowledge, stages of research, the organization of the experiment, the basics of inventive work, including the application for invention, experimental data.

**Mechanics of constructions of technical systems of the technical service.** The course is aimed at studying the dynamic models of specific machines and equipment of agricultural machinery, their mathematical description, calculation of current dynamic loads and recommendations for their reduction during operation.

**Automated design systems.** The discipline involves raising the general theoretical and practical professional level of future engineers of designers by familiarizing them with modern systems of automated designing of different classes, mastering of functional capabilities and methods of use, mastering the necessary techniques and practical skills of performing design work using the main systems of automated designing.

**Energy ecological assessment of machine design.** This discipline studies the methods and techniques of calculation and design at all stages of development of technical means, schemes of construction and operation of modern new equipment.

**Management and logistics of service enterprises.** The discipline studies the principles and methods of analytical management of enterprises of technical service, calculations of their main parameters, as well as logistics features in the field of technical service.

**Qualimetry.** This discipline studies the existing methods of calculations in technical measurements.

**Reliability of equipment of technical service.** This is a complex discipline, which studies: the laws of changing the technical condition of machines and their elements during operation, methods and methodics for eliminating defects and damage, providing the surfaces of parts the necessary physical and mechanical properties; technological processes of restoration of performance of typical details of agricultural machinery and equipment of technical service.

**Methods of designing the equipment of the technical service.** The course on this discipline is aimed at understanding the existing basics of designing agricultural machinery working units, assimilation of functional capabilities and schemes of their use, mastering the necessary techniques and practical skills in the implementation of works using the methods of designing the production purpose of agricultural machinery.

#### Optional components of EPP

##### *Free choice according to speciality*

*(Choice of 4 disciplines in one of the sub-blocks)*

**Planning of technical service companies.** The course on this discipline is aimed at studying the theoretical foundations and principles of optimization of agricultural machinery, the bases of calculation of productivity and technological harmonization of

autonomous machines and flow lines, rational schemes of planning and methods of designing and optimizing technological processes of service enterprises.

**Technological systems of repair production** The discipline studies technological systems of repair production, a technique of their designing, calculations and selection of technological equipment and executors of technological processes of the enterprises of the technical service.

**Rationing of operations of technical service.** The discipline studies the principles and methods of establishing standards for technological operations in the performance of service work.

**Reliability of technical systems of technical service.** The discipline is complex, which studies: the concept of technical systems and their classification; schemes of reliability of technical systems and their analysis; method of optimizing the number of backup system elements; the theory of graphs; logic-simulation model for reliability testing of technical systems; methods of ensuring the reliability of technical systems of agricultural machinery.

**Economics of technological systems.** The economic aspects of making design decisions are considered in order to maximize the benefits. Audit and practical classes on discipline envisage students mastering the economic bases of production in the conditions of agroindustrial enterprises.

**Economics of innovation in machinery.** The economic aspects of making design decisions in order to obtain maximum benefit are studied. Classes in the discipline provide students with mastery of the economic foundations of innovative industries in agro-industrial enterprises.

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**Training of masters of sciences  
in branch of knowledge "Architecture and Construction"  
Specialty 192 "CONSTRUCTION AND CIVIL ENGINEERING"  
educational program "CONSTRUCTION AND CIVIL ENGINEERING"**

Type of studying:	Licensed persons:
– full-time studying	25
Duration of studying:	
- full-time educational-professional program	1 years 4 months
- full-time educational-research program	1 years 10 months
Credits:	
– educational-professional program	90
- educational-research program	120
Language	Ukrainian, English
Academic degree	engineer-researcher of construction

**Concept of training**

Providing knowledge, skills and abilities of a specialist of a new innovative generation in the field of industrial and civil construction of objects of agro-industrial and environmental complexes on the basis of modern educational standards adapted to the requirements of the world's best educational programs for work in the public and private sectors of the Ukrainian economy.

The program provides for the realization of works commissioned by strategic partners for the development of innovative projects for industrial and civil construction of objects of agro-industrial and nature protection complexes.

**Educational and professional program of master's training**

The program provides for the realization of works commissioned by strategic partners for the development of innovative projects for industrial and civil construction of objects of agro-industrial and nature protection complexes.

**Areas of employment of graduates**

The graduate receives a full higher education and can work in positions corresponding to the 4th qualification level according to the state classifier of professions: assistant; teacher of a higher educational institution, engineer (civil engineering); construction supervisor; engineer-designer (civil engineering); engineer training; researcher (branch of engineering); Safety Engineer; engineer for patent and inventive work; production engineer; quality engineer; engineer for the introduction of new technique and technology; standardization engineer; design engineer; engineer researcher.

**Educational and research program of master's training**

The program provides for the implementation of work commissioned by strategic partners for the development of innovative projects for industrial and civil construction of agro-industrial and environmental complexes, conducting research in the field of construction.

**Areas of employment of graduates**

The graduate receives a full higher education and can work in positions that correspond to the 4th qualification level according to the state classifier of professions:

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assistant; higher education teacher, engineer (civil engineering); construction supervision engineer; design and estimate engineer; design engineer (civil engineering); training engineer; researcher (engineering field); Safety Engineer; patent and invention engineer; production preparation engineer; quality engineer; engineer for the introduction of new equipment and technology; standardization engineer; design engineer; research engineer.

### Practical training

Practical training of specialists is carried out in DP Knauf marketing Ukraine, Research Institute "Ukragroobrazovaniia", research institute "Ukragropromproduktivnost", research institute of construction production, design and development bureau of the Ukrainian research institute of forecasting and testing of technique and technologies for agricultural production named after. Leonid Pogorilly », Design and Development Bureau of the National Science Center« Institute of Mechanization and Electrification of Agriculture», «Agrobusiness Alliance «Astra» LLC, «John Deere Ukraine» LLC, «Newest Agro-Industrial Technologies», Research Institute of Building Structures, other practical bases training of students (listeners) of the university from among the leading institutions, enterprises, organizations in Ukraine and abroad, with appropriate conditions for conducting students' practice in accordance with the requirements of educational and professional programs of training specialists.

### Proposed Topics of Master's qualification Thesis

1. Office building of a state-owned agricultural enterprise using effective reinforced concrete slabs.
2. Steel frame made of welded twisted-nets of variable section with a flexible wall.
3. Non-woven and ferruginous steel reinforced concrete floors.
4. Technology of construction / deconstruction of an automobile overpass of agrarian grain-terminal complex.
5. Fire resistance of steel-reinforced concrete floors.
6. Reconstruction of the building "Agroleasing" with the superstructure.
7. Metal structures reinforced with carbon plastics, with static loading.
8. Steel-reinforced concrete beam structures with external reinforcement.
9. Fiber reinforced elements reinforced with steel fibers.
10. Multi-porous plates, reinforced with steel profiled flooring.

### Curriculum of Master training in educational program "Construction and civil engineering" (educational and professional program of Master's training)

Code	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Number of credits	Form of final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Industrial and environmental safety in construction	4	exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 2	Modeling of buildings and structures for agricultural purposes	5	exam, KP
CC 3	Reconstruction of buildings and structures	4	exam

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**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code</b>	<b>Components of the educational program (academic disciplines, course projects (works), practices, qualification work)</b>	<b>Number of credits</b>	<b>Form of final control</b>
CC 4	Basics of system analysis	4	exam
CC 5	Testing of building structures	4	exam
CC 6	Repair and exploitation of buildings and structures	4	exam
CC 7	Engineering protection and site preparation	4	exam
CC 8	CAD in construction	5	exam, KP
CC 9	Volume and spatial solutions for buildings and structures	6	exam, test, KP
CC 10	Technology of construction of buildings and structures for agricultural purposes	4	exam
CC 11	Internship	6	test
CC 12	Research practice	15	test
CC 13	Preparation and defense of master's qualification thesis	6	
<b>Optional components of EPP</b>			
<b><i>Free choice according to speciality</i></b>			
OC 1.1	Scientific bases of the theory of reliability and risks in construction	4	exam
OC 1.2	Scientific hypotheses and their experimental testing in construction		
OC 2.1	Mechatronic systems in construction	4	exam
OC 2.2	Construction robotics		
OC 2.3	Automation of residential and commercial buildings	4	exam
OC 3.1	Estimate and contractual documentation		
OC 3.2	Economics of innovation in construction	4	exam
OC 4.1	Theory and methods of scientific research		
OC 4.2	Industrial nanomaterials and nanotechnologies		
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Curriculum of Master training  
in educational program "Construction and civil engineering"  
(educational and research program of master's training)**

<b>Code</b>	<b>Components of the educational program (academic disciplines, course projects (works), practices, qualification work)</b>	<b>Number of credits</b>	<b>Form of final control</b>
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 1	Industrial and environmental safety in construction	4	exam
CC 2	Fundamentals of scientific research	4	exam
<b>Optional components of ERP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 3	Modeling of buildings and structures for agricultural purposes	5	exam, KP
CC 4	Reconstruction of buildings and structures	4	exam
CC 5	Basics of system analysis	4	exam
CC 6	Testing of building structures	4	exam
CC 7	Repair and exploitation of buildings and structures	4	exam
CC 8	Engineering protection and site preparation	4	exam
CC 9	Dynamics and stability of buildings and structures	4	exam
CC 10	CAD in construction	5	exam, KP
CC 11	Volume and spatial solutions for buildings and structures	5	exam

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code</b>	<b>Components of the educational program (academic disciplines, course projects (works), practices, qualification work)</b>	<b>Number of credits</b>	<b>Form of final control</b>
CC 12	Scientific and engineering research in construction	4	exam
CC 13	Spatial solutions of buildings and structures	6	exam, test, KP
CC 14	Technology of construction of buildings and structures for agricultural purposes	4	exam
CC 15.	Internship	6	test
CC 16	Research practice	15	test
CC 17	Preparation and defense of master's qualification thesis	6	
<b>Optional components of ERP</b>			
<i><b>Free choice according to speciality</b></i>			
OC 1.1	Scientific bases of the theory of reliability and risks in construction	4	exam
OC 1.2	Scientific hypotheses and their experimental testing in construction		
OC 2.1	Energy efficiency of buildings and structures	4	exam
OC 2.2	Energy efficient materials and technologies in construction		
OC 3.1	Mechatronic systems in construction	4	exam
OC 3.2	Construction robotics		
OC 3.3	Automation of residential and commercial buildings		
OC 4.1	Ecological building materials and technologies	4	exam
OC 4.2	Assessment of environmental safety of construction sites		
OC 5.1	Industrial nanomaterials and nanotechnologies	4	exam
OC 5.2	3-d printing in construction technology		
OC 6.1	Estimate and contractual documentation	4	exam
OC 6.2	Economics of innovation in construction		
<b>The total amount of compulsory components</b>		<b>88</b>	
<b>The total amount of optional components</b>		<b>32</b>	
<b>THE TOTAL AMOUNT OF ERP</b>		<b>120</b>	

### **Annotation of disciplines of the curriculum**

#### **Compulsory components**

**Industrial and environmental safety in construction.** The discipline considers the issues of functioning of the labor protection management system at construction enterprises - tasks, documentation, training on labor protection issues, labor safety control, etc. The discipline describes in detail the industrial hazardous and harmful factors in the construction industry, it presents the safety requirements that must be met when performing various works on the construction site. Environmental safety in construction studies the relationship between living organisms and the organic nature that surrounds them and the impact on them of construction, construction industry and construction machinery and mechanisms, as well as technological processes used in the preparation of construction sites.

**Fundamentals of scientific research.** The discipline studies the general provisions of scientific activity, in particular the concept of method and methodology and their role in scientific knowledge, stages of research, the organization of the experiment, the basics of inventive work, including the application for invention, experimental data.

**Modeling of buildings and structures.** To consolidate and deepen students' knowledge of theoretical material, as well as acquire skills to independently adopt technological and organizational decisions in matters of building norms of Ukraine, designing of technology and complex mechanization of mounting processes.

**Reconstruction of buildings and structures.** Obtaining theoretical knowledge and practical skills that will be needed in practical activities. Interdependent system of

preparation for implementation of certain types of work, establishment and maintenance of general order, priority and terms of work, supply of all kinds of resources to ensure the efficiency and quality of performance of certain types of work or in the process of reconstruction of buildings and structures.

**Basics of system analysis.** To form students knowledge of the basics of system analysis as a science, its goals and objectives, the main categories; to form skills in the organization of educational and scientific work for further implementation by a future specialist during the professional activity of research, teaching and management functions.

**Testing of building constructions.** To acquaint students with the basics, methods and innovative approaches of building construction testing (bases and foundations, reinforced concrete structures, metal constructions): with separate products and structural elements that are parts of buildings; with the appointment and interconnection of structures between themselves; with the basic requirements for structural elements of buildings and the buildings themselves, taking into account the specific conditions of their operation.

**Repair and operation of buildings and structures.** The theoretical basis for the repair and operation of structures of agricultural purpose.

**Engineering protection and preparation of territory.** Town-planning assessment of the territory by natural factors. Vertical planning of the city territory. Quantitative assessment of the relief. Methods of vertical planning. Rainwater drainage in the system of discharge of surface water. Theoretical foundations of designing territories in which dangerous physico-geological processes take place. Engineering improvement of rural territories of different purposes. Theoretical foundations of struggle with transport and industrial noise, gas pollution. Lighting of rural territories. Sanitary facilities. Organization of the collection of surface runoff.

**Dynamics and stability of buildings and structures.** Provides the basis for dynamic calculation of buildings and structures for sustainability.

**CAD in construction.** General information on the composition of the working project. Basic design kits. Composition of drawings of the basic kits of the mark GP, AR. Using the computer program "ArchiCAD" to perform architectural and construction drawings: plans for improvement, building plans, sections, facades, photorealistic perspective images. Using the textures of the "InteAr" library to cover the surface of walls, ceilings, roofs and objects. Corel Draw: Create new textures and edit existing ones; Editing JPEG and BMP image quality for better quality. Reproduction and assembly of drawings.

**Diagnosis of the technical condition of buildings and structures.** The course examines the main causes of damage to buildings and structures, equipment and methods of inspections and determination of the technical condition of construction sites.

**Scientific and engineering research in construction.** Provides theoretical and practical knowledge of engineering construction training.

**Spatial solutions of buildings and structures.** Theoretical basis of teaching theoretical foundations and principles for the development of effective building structures, methods of their management and automatic means of realization of systems in agricultural construction.

**Technology of construction of buildings and structures for agricultural purposes.** Theoretical bases of design of buildings and structures of this appointment, methods of their management and automatic means of realization of systems in agricultural construction.

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**Optional components**  
***Free choice according to speciality***

**Educational and professional program of master's training**

*(Choice of 4 disciplines in one of the sub-blocks)*

**Scientific bases of the theory of reliability and risks in construction.** To give knowledge about legal, organizational and methodical bases of the theory of reliability of houses and risks of innovative activity and innovative engineering technologies in agricultural construction.

**Scientific hypotheses and their experimental testing in construction.** The discipline is the theoretical basis of the set of knowledge and skills on the basis of which the future specialist will solve professional problems of conducting scientific research in the field of construction and acquires knowledge about the actual work of building structures, relevant properties of building materials, learns to create and apply real scientific substantiated calculation scheme of a building or structure, acquires skills in the sequence of scientific research in the construction industry and their analysis.

**Mechatronic systems in construction.** Teaching theoretical foundations and principles of construction of mechatronic systems in construction. Theoretical bases of construction of mechatronic systems, methods of their control and automatic means of realization of mechatronic systems in agricultural construction.

**Construction robotics.** Robotization replaces the hard work of builders with intelligent machines, increases productivity and quality of construction work, safety at construction sites and conservation of material and energy resources, as well as ensures the smooth operation of the entire construction complex. Knowledge of theoretical principles for the implementation of robotic systems in construction production plays an important role in the formation of a modern civil engineer. The course reveals the interdisciplinary connections on the basis of which modern buildings are designed and created using robots.

**Automation of residential and commercial buildings.** Automation of residential and commercial buildings provides comfort, safety and conservation of resources and provides for the coordinated operation of the heating and air conditioning system, as well as control of factors that affect the need to turn on or off the relevant systems. The course reveals the interdisciplinary links on the basis of which modern buildings are designed and constructed, which allows at the initial design stage to achieve optimal performance and increase energy efficiency.

**Estimate and contractual documentation.** The purpose of teaching the discipline is to form in applicants for higher education a set of theoretical knowledge and practical skills in the field of budgeting and contractual documentation, which they can use in future professional activities.

**Economics of innovation in construction.** Provides the formation of higher education students a set of theoretical knowledge and practical skills in the field of innovation economics, which they can apply in future professional activities for the effective implementation of the innovation component and finding optimal solutions.

**Industrial nanomaterials and nanotechnologies.** The course "Industrial nanomaterials and nanotechnologies" is a complex discipline that involves students gaining theoretical knowledge and practical skills in the science of methods of obtaining nutrients and methods of their physical and chemical analysis, studying their structure and properties of technology, efficiency, structural, physical, chemical and toxicological aspects of safety of materials and processes of the nanoindustry, as well as technical and technological support for the production of nanoproducts.

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**3-d printing in construction technology.** The discipline allows to reveal the possibilities of 3D printing technologies in order to increase the productivity of construction works and ensures safe operation. The discipline is directly related to the creation of 3D models of building models and their manufacture using a 3D printer, the structure and principle of operation of the 3D printer. Model design and subsequent 3D printing allows you to make prototypes of models and objects for further completion in a short time.

### **Educational and research program of master's training**

*(to choose from 6 disciplines in one of the sub-blocks)*

**Scientific bases of the theory of reliability and risks in construction.** To give knowledge about legal, organizational and methodical bases of the theory of reliability of houses and risks of innovative activity and innovative engineering technologies in agricultural construction.

**Scientific hypotheses and their experimental testing in construction.** The discipline is the theoretical basis of the set of knowledge and skills on the basis of which the future specialist will solve professional problems of conducting scientific research in the field of construction and acquires knowledge about the actual work of building structures, relevant properties of building materials, learns to create and apply real scientific substantiated calculation scheme of a building or structure, acquires skills in the sequence of scientific research in the construction industry and their analysis.

**Mechatronic systems in construction.** Teaching theoretical foundations and principles of construction of mechatronic systems in construction. Theoretical bases of construction of mechatronic systems, methods of their control and automatic means of realization of mechatronic systems in agricultural construction.

**Construction robotics.** Robotization replaces the hard work of builders with intelligent machines, increases productivity and quality of construction work, safety at construction sites and conservation of material and energy resources, as well as ensures the smooth operation of the entire construction complex. Knowledge of theoretical principles for the implementation of robotic systems in construction production plays an important role in the formation of a modern civil engineer. The course reveals the interdisciplinary connections on the basis of which modern buildings are designed and created using robots.

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**Estimate and contractual documentation.** The purpose of teaching the discipline is to form in applicants for higher education a set of theoretical knowledge and practical skills in the field of budgeting and contractual documentation, which they can use in future professional activities.

**Economics of innovation in construction.** Provides the formation of higher education students a set of theoretical knowledge and practical skills in the field of innovation economics, which they can apply in future professional activities for the effective implementation of the innovation component and finding optimal solutions.

**Industrial nanomaterials and nanotechnologies.** The course "Industrial nanomaterials and nanotechnologies" is a complex discipline that involves students gaining theoretical knowledge and practical skills in the science of methods of obtaining nutrients and methods of their physical and chemical analysis, studying their structure and

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properties of technology, efficiency, structural, physical, chemical and toxicological aspects of safety of materials and processes of the nanoindustry, as well as technical and technological support for the production of nanoproducts.

**3-d printing in construction technology.** The discipline allows to reveal the possibilities of 3D printing technologies in order to increase the productivity of construction works and ensures safe operation. The discipline is directly related to the creation of 3D models of building models and their manufacture using a 3D printer, the structure and principle of operation of the 3D printer. Model design and subsequent 3D printing allows you to make prototypes of models and objects for further completion in a short time.

## **FACULTY OF MECHANICS-TECHNOLOGY**

**Dean** – Doctor of Technical Science, Associate Professor Vyacheslav V. Bratishko  
Tel.: (044) 527-85-34  
E-mail: mtf11k@ukr.net  
Location: building № 11, room 334

Faculty organizes and coordinates educational process of master training in educations programs within specialties:

### **Specialty 208 "Agricultural Engineering"**

#### ***Educational program «Agricultural Engineering»***

Guarantor of the educational and professional program – Doctor of Technical Science, Associate Professor Vyacheslav V. Bratishko.

Guarantor of the educational and research program - Doctor of Technical Science, Professor Hennadii A. Holub.

Departments in charge of graduate training:

#### **Occupational Health and biotechnical systems in animal husbandry**

Tel.: (044) 527-85-35

E-mail: mechaniz\_chair@twin.nauu.kiev.ua

Head – Doctor of Technical Science, Professor Vasyl S. Khmelyovskiy

#### **Technical service and engineering management of them M.P. Momotenko**

Tel.: (044) 527-88-53

E-mail: rogovskii@nubip.edu.ua

Head – Doctor of Technical Science, Associate Professor Ivan L. Rohovskyi

#### **Agricultural machinery and systems engineering them. Acad. P.M. Vasilenko**

Tel.: (044) 527-85-37

E-mail: sgms@ukr.net

Head – PhD, Yuriy O. Gumenyuk

#### **Tractors, cars and bioenergy resources**

Tel.: (044) 527-88-95

E-mail: vvchuba@ukr.net

Head – PhD, Associate Professor Vyacheslav V. Chuba

### **Specialty 274 “Automobile Transport”**

#### ***Educational program «Automobile Transport»***

Guarantor of the educational and professional program – Doctor of Technical Science, Professor Valeriy D. Voytyuk

The graduating department:

#### **Transport technology and tools in agriculture**

Tel.: (044) 527-86-32

E-mail: ttubip@ukr.net

Head – PhD, Associate Professor Lilia A. Savchenko

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**Tractors, cars and bioenergy resources**

Tel.: (044) 527-88-95

E-mail: vvchuba@ukr.net

Head - PhD, Associate Professor Vyacheslav V. Chuba

**Technical service and engineering management of them. M.P. Momotenko**

Tel.: (044) 527-88-53

E-mail: rogovskii@nubip.edu.ua

Head – Doctor of Technical Science, Associate Professor Ivan L. Rohovskyi

**Specialty 275.03 “Transport Technologies (by Automobile Transport)”**

***Educational program «Transport Technologies (by Automobile Transport)»***

Guarantor of the educational and professional program – Doctor of Economics, Professor Oleg M. Zagursky.

Departments in charge of graduate training:

**Transport technology and tools in agriculture**

Tel.: (044) 527-86-32

E-mail: ttubip@ukr.net

Head – PhD, Associate Professor Lilia A. Savchenko

**Tractors, cars and bioenergy resources**

Tel.: (044) 527-88-95

E-mail: vvchuba@ukr.net

Head – PhD, Associate Professor Vyacheslav V. Chuba

**Technical service and engineering management of them. M. P. Momotenko**

Tel.: (044) 527-88-53

E-mail: rogovskii@nubip.edu.ua

Head – Doctor of Technical Science, Associate Professor Ivan L. Rohovskyi



**Training of masters of sciences  
branch of knowledge 20 "Agricultural science and food "  
in specialty 208 "AGRICULTURAL ENGINEERING"  
in educational program "AGRICULTURAL ENGINEERING"**

Form of Training:	Licensed number of persons:
– Full-time	200
– Part-time	125
Duration of training:	
– Full-time educational and professional program	1 year 4 months
– Full-time educational and research program	1 year 10 months
– Part -time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
– educational and research program	120
Language of training	Ukrainian, English, German
Qualification of graduates:	Master in Agroengineering

**The concept of training**

Providing knowledge and skills specialist new generation of innovation in the field of agricultural mechanization and agro-industrial facilities conservation systems based on modern standards of education adapted to the requirements of the world's best educational programs for the public and private sectors of Ukraine's economy.

**Educational and professional program of master's training**

***Optional Block "Technology and machinery in crop production"***

Optimization of complexes of machines and equipment under modern technologies of cultivation of agricultural crops on plant mechanization. Design and organization of technological processes, research of reliability and reliability of constructions of machines and equipment.

**Areas of employment of graduates**

Obtained full higher education and can work in positions corresponding to the 4th qualification level according to the state classifier of professions: chiefs and masters of production sites; Chiefs of Changes; managers of small enterprises without management apparatus; engineer mechanics; engineers for diagnosing the technical condition of the machine-tractor park; engineer technologists; labor safety engineers.

***Optional Block "Technology and machinery in animal husbandry"***

Optimization of complexes of machines and equipment under modern technological processes on mechanization of livestock and poultry industry. Research of reliability and reliability of constructions of machines and equipment.

**Areas of employment of graduates**

Obtained full higher education and can work in positions corresponding to the fourth qualification level according to the state classifier of professions: chiefs and masters of production sites; Chiefs of Changes; managers of small enterprises without management apparatus; engineer mechanics; engineers for diagnosing the technical condition of machinery and equipment for animal husbandry; engineer technologists; labor safety engineers.

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***Optional Block " Optimization of parameters, processes  
and operating modes of the APC "***

Increasing the level of reliability of agricultural machinery on the basis of structural analysis of its reliability and rationale of rational technological processes, parameters and operating modes. Research and design of technological and kinematic schemes, aggregates, nodes, working bodies.

**Areas of employment of graduates**

Obtained full higher education and can work in positions corresponding to the 4th qualification level according to the state classifier of professions: pedagogical, scientific research and organizational and managerial activity, in research departments of enterprises, scientific research and design institutions, as well as in higher educational establishments at the positions of heads of industrial divisions in industry; chiefs and masters of production sites; Chiefs of Changes; Heads of the laboratory (education); heads of student research bureaus; heads of practice, heads of research laboratories; researcher; engineer mechanics; assistants and teachers of higher educational establishments.

**Educational and research program of master's training**

Research of working processes of agricultural machinery, on the basis of structural analysis of its reliability and rationale of rational technological processes, parameters and operating modes. Research and design of technological and kinematic schemes, aggregates, nodes, working bodies.

**Areas of employment of graduates**

Obtained full higher education and can work in positions corresponding to the 4th qualification level according to the state classifier of professions: pedagogical, scientific research and organizational and managerial activity, in research departments of enterprises, scientific research and design institutions, as well as in higher educational establishments at the positions of heads of industrial divisions in industry; chiefs and masters of production sites; Chiefs of Changes; Heads of the laboratory (education); heads of student research bureaus; heads of practice, heads of research laboratories; researcher; engineer mechanics; assistants and teachers of higher educational establishments.

**Practical training.**

Through laboratory and practical classes, training, technology, research, and other pre-diploma practice areas: crops, livestock, technical service, conservation, processing and storage of plant products, technology, biodiesel, animal breeding, the development of mechanized methods of diagnosis and prevention animal diseases, with repair technology. g technology, test with. g technology and their legal significance, economics, accounting, marketing and management in the agricultural field of production and so on. These databases are: Ukrainian Scientific Research Institute of forecasting and test equipment and technologies for agricultural production to them. Leonid burned "; National Scientific Center "Institute of Mechanization and Electrification of Agriculture"; JSC "Agriculture"; PJSC "Rayahrotehservis"; PDP AF "Concord-Agro", JV Agricultural firm "Dream"; LLC "Concern" SIMEKS-Agro "(Vinnitsa region.) Other bases of practical training of students (students) University from among leading institutions, enterprises, organizations of any ownership in Ukraine and abroad, with appropriate conditions for students according practice the requirements of education and professional training programs.

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### Proposed Topics for Master qualification Theses

1. Research constructive scheme and justification count parameters group milk yield.
2. Study the basic parameters and system design of parallel driving machine and tractor units.
3. Analysis of statistical processing parameter flow refuse and improvement process of repair tractors.
4. Study process parameters and settings for processing soybean seeds rotating thermal camera type.
5. Investigation of complex machines and determine their optimal composition for growing and harvesting of winter wheat.
6. Research the operational performance of the machine with the tractor units when using fuels of vegetable origin.
7. Research and design of computer technology biodiesel production process of improvement cavitation mixing reagents.
8. Research Feeds major damage to the development process of their elimination.
9. Research damaged parts wheel gearboxes combine harvesters and development process of recovery.

### Curriculum of Master training in educational program "Agricultural engineering" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Legislation and Law in agriculture	4	exam
CC 2	Economy of technological systems	4	exam
CC 3	Methodology of scientific research	4	exam
CC 4	Agrarian Policy	5	exam
CC 5	Business Foreign Language	5	exam
<b>Total</b>		<b>22</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6	Mechatronic system engineering APC	5	exam
CC 7	Precision Agriculture	5	exam
CC 8	Occupational Health	4	exam
CC 9	Internship	21	test
CC 10	Preparation and defense of master's qualification thesis	9	Protection of work
<b>Total</b>		<b>44</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty</i></b>			
<b><i>Optional Block 1 «Technology and machinery in crop production»</i></b>			
OC 1.1	Design and calculation systems in crop	4	exam
OC 1.2	Designing processes in plant	4	exam
OC 1.3	Process control in crop	4	exam
OC 1.4	Innovative engineering technologies	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>Total</b>		<b>16</b>	
<i>Optional Block 2 «Technology and machinery in animal husbandry»</i>			
OC 2.1	Design and calculation of technological systems in animal husbandry	4	exam
OC 2.2	Designing processes in livestock	4	exam
OC 2.3	Process control in livestock	4	exam
OC 2.4	Ecological security processes	4	exam
<b>Total</b>		<b>16</b>	
<i>Optional Block 3 «Optimization of parameters, processes and operating modes of the APC»</i>			
OC 3.1	Designing processes and modes of technology APC	4	exam
OC 3.2	Modeling business processes and machines	4	exam
OC 3.3	Testing of agriculture technology	4	exam
OC 3.4	Logistics in mechanization of agriculture	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Legislation and Law in agriculture.** Provide students with a complete summary of the main problems of law and law in agriculture at the objective, ideologically unbiased contemporary vision of modern science, synthesis of acquired knowledge in professional and humanities disciplines in a holistic outlook to provide a framework and methodological training masters humanitarian components.

**Economy of technological systems.** Is to explore relations in the middle of technological systems, skills planning, pricing and investment, definition of efficiency of operation.

**Methodology and organization of scientific research on the basics of intellectual property.** Raising general theoretical and practical engineering of future masters and researchers by mastering the basics of theoretical knowledge and practical skills on the general concept of experimental methods.

**Business Foreign Language.** Acquiring knowledge, skills and abilities necessary to ensure that masters communicative ability in the fields of professional communication.

**Agrarian policy.** This discipline acquaints future professionals with the basics of policy in the agricultural sector, makes it possible to master methodical and methodological basis for development and implementation of measures to support and ensure the development of agriculture in the system of linkages in the national economy, and assess from the perspective of the theory of practical action government agencies on regulation of the agricultural production of the country. We study both domestic and foreign experience. As a result of learning students get the opportunity on a professional basis to form their own opinion about the processes and phenomena occurring in the agricultural sector of the state.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Mechatronic system engineering agribusiness.** Teaching theoretical foundations and principles of mechatronic systems agricultural machines. Theoretical bases of

mechatronic systems, methods for their control and automatic means of implementing mechatronic systems with-machines.

**Precision agriculture.** Discipline forms the students knowledge of the scientific basis for the development of best practices and organization of mechanized crop production based on modern information technology. Discipline reveals the ways and methods of solving pressing problems highly efficient use of agricultural machinery in the field using variable technology standards (doses) introducing technological materials based on global positioning satellite systems. There is a formation specialists with the ability to choose the best technologies of growing crops with minimal materials and energy and the preservation of soil fertility and the environment.

**Occupational Health.** The educational discipline, which describes the organizational principles for the development and implementation of the management system of labor protection in the agrarian sector and at the enterprises of agrarian and industrial complex, organizational measures for control of the state of labor protection in agricultural production.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1 «Technology and machinery in crop production»*

**Design and calculation of technological systems in crop production.** Provide scientific principles and train future engineers (professional master) to design and calculate crop technology system.

**Designing processes in plant.** Teaching students basic provisions in the village of Gd engineering, including design process of modern engineering systems in agriculture. Providing justification for calculating and designing technological requirements for components and assemblies cars.

**Process control in crop.** Receive future specialists in agricultural mechanization necessary knowledge systems of advanced mechanized production lines and processes of crop production.

**Innovative engineering technologies** Examines theoretical and organizational bases of innovative engineering technologies. Consider their regulatory and technical support and legal laws in innovative technologies.

##### *Optional Block 2 «Technology and machinery in animal husbandry»*

**Design and calculation of technological systems in animal husbandry.** Formation of professional knowledge of students on general and specific issues managing large technical systems on the example of operation of machines and equipment for livestock logistics system.

**Design processes in livestock.** Teaching students the basic provisions of c-d design, including the reconstruction of livestock enterprises and the design process of modern engineering systems in animal husbandry. Providing justification for calculating and designing technological requirements for areas of machinery and equipment.

**Process control in livestock.** Receive future specialists in agricultural mechanization necessary knowledge systems of advanced mechanized production lines and processes of livestock production.

**Ecological security processes.** Raising general theoretical and practical engineering of future mechanical engineers by mastering the basics of theoretical knowledge and practical skills on environmental safety processes ahrobioinzheneriyi and environment in terms of resource saving natural resources.

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*Optional Block 3 «Optimization of parameters and modes of technology APC»*

**Design modes, processes and technology APC.** Formation of professional knowledge of students on general and specific issues managing large technical systems on the example design modes, process and technology of agriculture.

**Modeling business processes and machines.** Formation of professional knowledge of models and modeling business processes and machines, types of models and key stages of modeling, theoretical and practical methodological foundations, methods and objects object modeling of technological processes of production, economic and mathematical models and simulation processes and mechanisms for agriculture machines using a personal computer.

**Testing of agricultural machinery.** Raising general theoretical and practical research of future professionals through the assimilation of the foundations of theoretical knowledge and practical skills on general concepts and methods for testing of agricultural machinery.

**Logistics in the mechanization of agriculture.** Raising general theoretical and practical level mechanical engineer of agricultural production by mastering basic theoretical principles and practical skills of logistics concepts to ensure the movement of agricultural products to the consumer.

**Curriculum of Master training  
in educational program “Agricultural engineering”  
(educational and research program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 1	Scientific communications in master's research	4	exam
CC 2	Methodology of scientific research	4	exam
CC 3	Agrarian Policy	4	exam
CC 4	Economy of technological systems	4	exam
CC 5	Business Foreign Language	4	exam
<b>Total</b>		<b>20</b>	
<b>Optional components of ERP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 6	Mechatronic system engineering APC	5	exam
CC 7	Innovative engineering technologies	5	exam
CC 8	Logistics in mechanization of agriculture	6	exam
CC 9	Precision Agriculture	4	exam
CC 10	Occupational Health	4	exam
CC 11	Modeling work processes and machines	5	exam
CC 12	Safety of production processes in agroengineering	4	exam
CC 13	Testing of agricultural machinery	5	exam
CC 14	Internship	21	test
CC 15	Preparation and defense of master's qualification thesis	9	Protection of work
<b>Total</b>		<b>68</b>	
<b>Optional components of ERP</b>			
<b>Free choice according to specialty</b>			

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
<i>Optional block 1</i>			
OC 1.1	Design of biotechnological processes	4	exam
OC 1.2	Bioenergy systems in agricultural production	4	exam
OC 1.3	The system is a man-machine-animal	4	exam
OC 1.4	Mechanization of the processes of composting	4	exam
OC 1.5	Industrial sanitation	4	exam
OC 1.6	Measuring instruments and measurement methods	4	exam
<b>Total</b>		<b>24</b>	
<i>Optional block 2</i>			
OC 2.1	Ecological security processes	4	exam
OC 2.2	Designing processes in plant	4	exam
OC 2.3	Design modes, processes and technology APC	4	exam
OC 2.4	Design processes in livestock	4	exam
OC 2.5	Process control in crop	4	exam
OC 2.6	Process control in livestock	4	exam
<b>Total</b>		<b>24</b>	
<b>The total amount of compulsory components</b>		<b>88</b>	
<b>The total amount of optional components</b>		<b>32</b>	
<b>THE TOTAL AMOUNT OF ERP</b>			<b>120</b>

**Annotations of disciplines in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of ERP**

**Scientific communications in master's research.** Introduction to the digital landscape and tools to support scientific communications of researchers; raising the level of digital competencies; creation of a personal educational environment and profiles for the identification of the researcher in the scientometric space; review of regulations, initiatives and sources related to open science and open access, copyright in electronic content, ethics of electronic communications; gaining experience in research data management, scientific communication, presentation and dissemination of research results in digital format and their evaluation; building the image of a scientist.

**Agrarian policy.** This discipline acquaints future professionals with the basics of policy in the agricultural sector, makes it possible to master methodical and methodological basis for development and implementation of measures to support and ensure the development of agriculture in the system of linkages in the national economy, and assess from the perspective of the theory of practical action government agencies on regulation of the agricultural production of the country.

**Methodology of scientific research.** Raising general theoretical and practical engineering of future masters and researchers by mastering the basics of theoretical knowledge and practical skills on the general concept of experimental methods

**Business Foreign Language.** Acquiring knowledge, skills and abilities necessary to ensure that masters communicative ability in the fields of professional communication.

**Economy of technological systems.** Is to explore relations in the middle of technological systems, skills planning, pricing and investment, definition of efficiency of operation.

**SPECIAL (PROFESSIONAL) TRAINING CYCLE**  
**Compulsory components of ERP**

**Mechatronic system engineering agribusiness.** Teaching theoretical foundations and principles of mechatronic systems agricultural machines. Theoretical bases of

mechatronic systems, methods for their control and automatic means of implementing mechatronic systems with-machines.

**Innovative engineering technologies** Examines theoretical and organizational bases of innovative engineering technologies. Consider their regulatory and technical support and legal laws in innovative technologies.

**Logistics in the mechanization of agriculture.** Raising general theoretical and practical level mechanical engineer of agricultural production by mastering basic theoretical principles and practical skills of logistics concepts to ensure the movement of agricultural products to the consumer.

**Precision agriculture.** Discipline forms the students knowledge of the scientific basis for the development of best practices and organization of mechanized crop production based on modern information technology. Discipline reveals the ways and methods of solving pressing problems highly efficient use of agricultural machinery in the field using variable technology standards (doses) introducing technological materials based on global positioning satellite systems. There is a formation specialists with the ability to choose the best technologies of growing crops with minimal materials and energy and the preservation of soil fertility and the environment.

**Safety of production processes in agroengineering.** Provides theoretical and practical training of students to create normative working conditions and prevention of injuries on mechanized processes in agriculture, studying the components of safety of technological processes and equipment of AIC and technical means of safety on mobile agricultural machinery and stationary equipment.

**Modeling of work processes and machines.** Formation of professional knowledge about models and modeling of work processes and machines, types of models and main stages of modeling, theoretical and practical methodological bases, methods and objects of the subject of modeling of technological processes of production, economic and mathematical models and modeling of technological processes of mechanisms and machines of agro-industrial complex using a personal computer.

**Occupational Health.** The educational discipline, which describes the organizational principles for the development and implementation of the management system of labor protection in the agrarian sector and at the enterprises of agrarian and industrial complex, organizational measures for control of the state of labor protection in agricultural production.

**Industrial sanitation.** The discipline is aimed at the study of modern methods of diagnostic research and preventive measures against infectious diseases. In the process of study, students learn morphological features and the cycle of development of pathogens of diseases, their systematic situation, etiology, as well as measures of industrial sanitation in enterprises agrarian profile.

**Measuring instruments and measurement methods.** Study of methods, rules and instructions on the use of measuring instruments in research work.

**Testing of agricultural machinery.** Increasing the general theoretical and practical research level of future specialists by mastering the theoretical knowledge and practical skills on general concepts and methods for testing agricultural machinery.

### **Optional components of ERP**

#### ***Free choice according to specialty***

##### *Optional block 1*

**Design of biotechnological processes.** Formation of professional knowledge of students on general and specific issues of managing large technical systems an example design of biotechnological processes.

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**Bioenergy systems in agricultural production.** Formation of professional knowledge about bioenergy systems theoretical and practical methodological foundations, methods and objects bioenergy in agricultural production using a personal computer.

**System "man-machine-animal".** Getting future specialists in the field of agroengineering necessary knowledge of the system of modern mechanized technological lines and livestock production processes.

**Mechanization of the processes of composting.** Getting the future experts in the field of agricultural mechanization necessary knowledge systems of modern mechanized production lines and production processes of biocompost.

*Optional block 2*

**Ecological security processes.** Raising general theoretical and practical engineering of future mechanical engineers by mastering the basics of theoretical knowledge and practical skills on environmental safety processes ahrobioinzheneriyi and environment in terms of resource saving natural resources.

**Designing processes in plant.** Teaching students basic provisions in the village of Gd engineering, including design process of modern engineering systems in agriculture. Providing justification for calculating and designing technological requirements for components and assemblies cars.

**Design modes, processes and technology APC.** Formation of professional knowledge of students on general and specific issues managing large technical systems on the example design modes, process and technology of agriculture.

**Design processes in livestock.** Teaching students the basic provisions of c-d design, including the reconstruction of livestock enterprises and the design process of modern engineering systems in animal husbandry. Providing justification for calculating and designing technological requirements for areas of machinery and equipment.

**Process control in crop.** Receive future specialists in agricultural mechanization necessary knowledge systems of advanced mechanized production lines and processes of crop production.

**Process control in livestock.** Receive future specialists in agricultural mechanization necessary knowledge systems of advanced mechanized production lines and processes of livestock production.

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**Training of masters of sciences  
branch of knowledge 27 "Transport"  
in specialty 274 "AUTOMOBILE TRANSPORT"  
educational program "AUTOMOBILE TRANSPORT"**

Form of Training:	Licensed number of persons:
– Full-time	50
Duration of training	
– Full-time educational and professional program	1 year 4 months
Credits:	
– educational and professional program	90 ECTS
Language of training	Ukrainian, English, German
Qualification of graduates:	Master in Automobile Transport

**The concept of training**

Design freight motor means and loading and unloading operations in the production of agricultural products. The objects of research are the specificity and diversity of agricultural goods, the terms and conditions of carriage of cargo flows on short, medium and long distances.

**Areas of employment for graduates**

Receives higher education and can work in positions that correspond to the fourth qualification level according to the State classifier professions: dispatchers, engineers traffic service and logistic department managers trucking companies; transport department managers of large corporations; Specialist of road transport and infrastructure; engineers control department of the State Automobile Inspectorate; research staff research and design institutes transport profile; teachers in driving schools, secondary professional and higher education.

**Practical training**

It is carried out through laboratory and practical classes, educational, technological, research, pre-diploma and other practices in the field of motor transport. Such bases are: Ukrainian Research Institute for forecasting and testing of technology and technology for agricultural production to them. Leonid Pogorelyi "; National Science Center "Institute of Mechanization and Electrification of Agriculture"; OJSC "Agricultural Technologies"; PJSC "Rairohtekhservis"; PP Concord-Agro AF; STOV Agrofirma "Mriya"; Concern Simex-Agro LLC (Vinnitsa region), other bases of practical training of students (students) of the university from among the leading institutions, enterprises, organizations of any form of ownership in Ukraine and abroad, with appropriate conditions for the practice of students respectively to the requirements of educational and professional training programs.

**Proposed Topics of master's qualification thesis:**

1. Study of technical and economic parameters of an automobile by an effective implementation of logistic approaches.
  2. Improve handling for transportation of vegetable-fruit groups transport system in the agricultural company.
  3. Improvement of transport and production process of grain at harvest using variables bodies.
  4. Justification transport and production process at harvesting corn.
  5. Improvement of transport and traffic during the production process of dairy products in the Kiev region.
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6. Justification transport and production process in making organic fertilizers.
7. Study of the main indicators of road transport and their improvement Ltd. "Ray" Kyiv region
8. Improving transport and process the transport of sugar beet in agricultural farm.
9. Improving transport and production process at transportation fertilizers in LLC "Torch" Vinnitsa region.
10. Improving transport and logistics processes during transportation of fruits and berries in agricultural farm.

**Curriculum of Master training  
in educational program "Automobile Transport "  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Applied Computer Technologies in Automobile Transport	4	exam
CC 2	Occupational safety in motor transport	6	exam
CC 3	Economy of motor transport	4	exam
<b>Total</b>		<b>14</b>	
<b>Optional components of EPP</b>			
<b>Optional subjects by Student's Choice</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Tests of cars and engines	4	exam
CC 5	Scientific basis of technical operation of machines	6	exam
CC 6	Design and calculation of autoservice enterprises	4	exam
CC 7	Modern methods of MOT and diagnostics of automobiles	4	exam
CC 8	Management of motor transport enterprises	4	exam
CC 9	Internship	21	test
CC 10	Preparation and defense of master's qualification thesis	9	Protection of work
<b>Total</b>		<b>52</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
<i>Optional block 1</i>			
OC 1.1	Transport technologies in agrarian production	4	exam
OC 1.2	Methodology and organization of scientific research on the basics of intellectual property	4	exam
OC 1.3	Organization and safety of motor transport	4	exam
OC 1.4	Operational properties of cars	4	exam
<b>Total</b>		<b>16</b>	
<i>Optional block 2</i>			
OC 2.1	Technologies and methods of vehicle storage	4	exam
OC 2.2	Hybrid and electric cars	4	exam
OC 2.3	Adaptive technologies in technical operation of cars	4	exam
OC 2.4	Technology of scientific research of motor transport	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

## Annotations of subjects in the curriculum

### GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Applied Computer Technologies in Automobile Transport.** Teaching of theoretical foundations and principles of constructing algorithms and mechatronic systems of machines. Theoretical bases of automation in the management of motor transport and automatic means of realization of mechatronic systems of automobiles.

**Economy of motor transport.** It involves studying relationships in transport systems, gaining planning skills, pricing and investing, and determining the effectiveness of the operation.

**Occupational safety in motor transport.** Improvement of the general theoretical and practical engineering level of future engineers of transport by mastering the theoretical knowledge and practical skills on the issues of environmental safety of technological processes of transport and environment in the conditions of resource-saving nature use.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components of EPP

**Operational properties of cars.** Improvement of the general theoretical and practical level of mechanical engineer of agricultural production by mastering the basic theoretical positions and practical skills on the logistic concept for ensuring the transfer of agricultural products to the consumer.

**Design and calculation of autoservice enterprises.** Increasing the general theoretical and practical research level of future specialists by mastering the foundations of theoretical knowledge and practical skills on general concepts and methods of designing and calculating autoservice enterprises.

**Tests of cars and engines.** Increasing the general theoretical and practical research level of future specialists by mastering the theoretical knowledge and practical skills on general concepts and methods for testing vehicles and engines.

**Modern methods of MOT and diagnostics of automobiles.** In the curriculum the discipline provides for the study of theoretical and practical issues related to the reliability and effective management of enterprises and units of technical service of machines, their interaction with manufacturers, the scope of providing services in the conditions of seasonal maintenance of motor transport, a wide range of nomenclature of machines, their technical state for the purpose of efficient usetechnology, labor and socio-economic resources.

**Management of motor transport enterprises.** Formation of professional knowledge of students on the general and specific issues of management of large automobile enterprises, for example, the operation of machines and equipment of service enterprises, logistics of automobile parks.

#### Optional components of EPP

#### *Free choice according to specialty*

##### *Optional block 1*

**Transport technologies in agrarian production.** Getting future specialists in the field of automobile industry the necessary knowledge of the system of the newest mechanized technological lines and processes of application of motor transport.

**Methodology and organization of scientific research on the basics of intellectual property.** Raising general theoretical and practical engineering of future masters and researchers by mastering the basics of theoretical knowledge and practical skills on the general concept of experimental methods.

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**Organization and safety of motor transport.** Studying the theoretical and organizational foundations of innovative automotive technologies. Consider their normative and technical support and legal acts on the organization of motor transport.

**Scientific basis of technical operation of machines.** To deepen the knowledge of masters on the theoretical material about the basic laws of nature, on the basis of which create the calculation schemes necessary for engineering, but also as a means of educating future specialists in the skills of scientific generalizations.

*Optional block 2*

**Technologies and methods of vehicle storage.** Students are provided with the basics of knowledge about the methods of storage of vehicles, preparing it for conservation with the use of modern technologies with minimal losses; to teach students to implement and find the most effective technologies and means of storage of motor transport.

**Hybrid and electric cars.** Study of the use of systems "electric motor - internal combustion engine", "electric motor-transmission", their practical implementation in road transport technologies to reduce fuel consumption and harmful emissions.

**Adaptive technologies in technical operation of cars.** Training of a specialist capable of competently solving the issues of technical operation of cars and equipment in the conditions of enterprises. The subject of study is the methods of experimental determination and theoretical calculation of the main technical and operational indicators of road transport and complete equipment and their adjustment in the user's environment.

**Technology of scientific research of motor transport.** Study of methods of scientific research of motor transport. Analysis of technological processes of work, units, aggregates and auxiliary equipment of cars.

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**Training of masters of sciences  
in branch of knowledge 27 "Transport "  
in specialty 275.03 "TRANSPORT TECHNOLOGIES  
(BY AUTOMOBILE TRANSPORT)"  
educational program "TRANSPORT TECHNOLOGIES  
(BY AUTOMOBILE TRANSPORT)"**

Form of Training:	Licensed number of persons:
– Full-time	30
– Part-time	30
Duration of training	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits:	
– educational and professional program	90 ECTS
Language of training	Ukrainian, English
Qualification of graduates:	Master in Transportation Technology

**The concept of training**

Providing knowledge and skills specialist new generation of innovation in the organization of traffic and transport management (road transport) and environmental facilities agroindustrial complexes based on modern standards of education adapted to the requirements of the world's best educational programs for the public and private sectors Ukraine.

**Areas of employment for graduates**

Receives higher education and can work in positions that correspond to the fourth qualification level according to the State classifier professions: dispatchers, engineers traffic service and logistic department managers trucking companies; transport department managers of large corporations; Specialist of road transport and infrastructure; engineers control department of the State Automobile Inspectorate; research staff research and design institutes transport profile; teachers in driving schools, secondary professional and higher education.

**Practical training**

Through laboratory and practical classes, training, technology, research, and other pre-diploma practice areas: crops, livestock, technical service, conservation, processing and storage of plant products, technology, biodiesel, animal breeding, the legal value, economy, accounting marketing and management in the field of agricultural production and so on. These databases are: John Deere Ukraine, Amaco Ukraine, Myronivsky ZVVK, Astra; Department district traffic police Internal Affairs of Ukraine MoU in (Kiev, Crimea, Cherkasy, Khmelnytsky, Chernihiv, Zhytomyr, Rivne, Volyn, Poltava, etc.) and the Office of Research Affairs of Ukraine traffic police in the regions; other bases of practical training of students (students) University from among leading institutions, enterprises, organizations of any ownership in Ukraine and abroad, with adequate conditions for practice of students in accordance with the requirements of education and professional training programs.

**Proposed Topics of master's qualification thesis:**

1. Study of technical and economic parameters of an automobile by an effective implementation of logistic approaches.

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2. Improve handling for transportation of vegetable-fruit groups transport system in the agricultural company.
3. Improvement of transport and production process of grain at harvest using variables bodies.
4. Justification transport and production process at harvesting corn.
5. Improvement of transport and traffic during the production process of dairy products in the Kiev region.
6. Justification transport and production process in making organic fertilizers.
7. Study of the main indicators of road transport and their improvement Ltd. "Ray" Kyiv region
8. Improving transport and process the transport of sugar beet in agricultural farm.
9. Improving transport and production process at transportation fertilizers in LLC "Torch" Vinnitsa region.
10. Improving transport and logistics processes during transportation of fruits and berries in agricultural farm.

**Curriculum of Master training  
in educational program "Transport Technologies (by Automobile Transport)"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Methodology of scientific research	4	exam
CC 2	Occupational Health	4	exam
CC 3	Technical examination of traffic accidents	4	exam
<b>Total</b>		<b>12</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Quality management of motor transport services	5	exam
CC 5	Organization of transport provision of rural areas	4	exam
CC 6	Modeling of complex transport processes and systems	4	exam
CC 7	Supply chain management	5	exam
CC 8	Freight forwarding activities	6	exam
CC 9	Internship	21	test
CC 10	Preparation and defense of qualification master's thesis	9	Protection of work
<b>Total</b>		<b>54</b>	
<b>Optional components of EPP</b>			
<i>Optional components by specialty</i>			
OC 1.1	Information Technology in transport	4	exam
OC 1.2	Domestic roads		
OC 2.1	Economics of transport and traffic	4	exam
OC 2.2	Management of motor transport enterprises		
OC 3.1	Technical service vehicles	4	exam
OC 3.2	Transport technologies in agricultural production		
OC 4.1	Recycling vehicles	4	exam
OC 4.2	Performance properties of cars		



Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
Total		16	
The total amount of compulsory components		66	
The total amount of optional components		24	
THE TOTAL AMOUNT OF EPP			90

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE

##### Compulsory components of EPP

**Methodology of scientific research** Improving the general theoretical and practical engineering level of future masters of transport by mastering the basics of theoretical knowledge and practical skills on the general concept of experimental methods of research on the organization of transportation and management in the automotive industry.

**Occupational Health.** Acquisition of skills to develop innovative organizational measures to prevent accidents, injuries and morbidity in the organization of transportation and management in the automotive industry.

**Technical examination of traffic accidents.** Formation of skills that allow to make the right choice of methods of simulating the investigation of a crime according to a previously developed plot, more rationally determine the sequence of investigative actions, practices of detection, investigation and prevention of crimes, the mechanism of the event, disclosure of internal links and contradictions in the studied phenomena and facts of transport technologies.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE

##### Compulsory components of EPP

**Quality management of motor transport services.** Obtaining knowledge that meets the current level in the field of quality management of vehicles, acquaintance with the main achievements in the theory and practice of quality management in different countries, the need to use achievements in quality management, its organizational systems, the need to move to production management "through quality" using international ISO 9000 series standards, which are accepted in Ukraine as national.

**Organization of transport provision of rural areas.** Disclosure of the essence and methods of developing a set of rules for full use of the potential of vehicles in rural areas, with the specific properties of the goods of the agro-industrial complex and natural production conditions, determining the need for these tools to achieve programmed results and compliance.

**Modeling of complex transport processes and systems.** Improving the general theoretical and practical research level of future specialists by mastering the basics of theoretical knowledge and practical skills on general concepts and techniques for modeling complex transport processes and systems.

**Supply chain management.** Mastering the theoretical foundations of supply chain management; acquaintance with the main business processes in supply chains; acquiring skills in designing and planning supply chains; study of the basics of creating a single information space for supply chain participants; acquaintance with the criteria of quality and efficiency of supply chains.

**Freight forwarding activities.** Formation of system knowledge and practical skills in freight forwarding activities by its types and forms, features of technological processes of freight forwarding services. In accordance with the methods of organization of transport

and forwarding services, determination of parameters of transport and forwarding services; perspective directions of further development of transport and forwarding service and determination of its efficiency.

**Optional components of EPP**  
***Free choice according to specialty***

**Information technology in transport.** Acquisition of knowledge, skills and abilities aimed at the creation and use of navigation subsystems, units and complexes of motor vehicles. Learning the basics of information analysis and synthesis of navigation systems in vehicles with the help of computer systems of different levels and purposes.

**Domestic roads.** Acquisition of skills to develop innovative organizational measures for the efficiency of operation and design of domestic roads, prevention of accidents, injuries and morbidity in the organization of transportation and management in the automotive industry.

**Economics of transport and traffic.** It consists in studying the relations within the technological systems, acquiring skills of planning, pricing and investing, determining the effectiveness of the organization of transportation and management in the automotive industry.

**Management of motor transport enterprises.** Formation of professional knowledge of students on general and specific issues of management of large automobile enterprises on the example of operation of machines and equipment of service enterprises, material and technical support of car parks.

**Technical service of vehicles.** Providing knowledge on methods and means of maintaining the technical condition of the car, its units, systems and mechanisms, organizations for maintenance and repair of cars.

**Transport technologies in agricultural production.** Obtaining future specialists in the field of automotive industry the necessary knowledge of the latest mechanized technological lines and processes of application of road transport.

**Recycling vehicles.** Disclosure of the methodology of designing recycling systems of different levels, the concept of recycling, the mechanism of organizational coordination, forms of interaction between organizations; be able to: develop a recycling system project, analyze the recycling environment, paint an algorithm for "problematic" formation of recycling systems, develop the organizational structure of the recycling system, identify and analyze business processes of the organization, use recycling principles to optimize the system.

**Performance properties of cars.** Improving the general theoretical and practical level of mechanical engineer of agricultural production by mastering the basic theoretical principles and practical skills of the logistics concept to ensure the movement of agricultural products to the consumer.

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**EDUCATION AND RESEARCH INSTITUTE  
OF ENERGETICS, AUTOMATICS AND ENERGY SAVING**

**Director** – Doctor of Technical Sciences, Professor, Viktor Kaplun

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Location: Building № 8, Room 11

ERI organizes and coordinates educational process of master training in educational program within specialties:

**Specialty 141 "Power Engineering, Electrical Engineering and Electrical Mechanics"**

***Educational program "Power Engineering, Electrical Engineering and Electrical Mechanics"***

Guarantor of the educational and professional program – Doctor of Technical Sciences, Professor Mykola Zablodskyi

Guarantor of the educational and research program – Doctor of Technical Sciences, Professor Mykola Grebchenko

Graduating departments:

**Electrical engineering, electromechanics and electrotechnology**

Tel.: (044) 527-87-55; (044) 527-87-89.

E-mail: elmash\_nubip@ukr.net

Head of department – associate professor Ivan Radko

**Power Supply named after Prof. V.M. Synkov**

Tel.: (044) 527-85-80.

E-mail: kozyrskyivv@gmail.com

Head of department – Doctor of Technical Sciences, Professor Volodimir Kozirsky.

**Specialty 151 "Automation and Computer integrated Technologies"**

***Educational program "Automated Control of Technological Processes"***

Guarantor of the educational and professional program – Doctor of Technical Sciences, Professor Vitaliy Lysenko

Guarantor of the educational and research program – Doctor of Technical Sciences, Professor Valeriy Koval

Graduating department:

**Department of Automatics and Robototechnical Systems named after acad.**

**I.I. Martynenko**

Tel.: (044) 527-82-22, (044) 527-83-82.

E-mail: avto.ea@gmail.com

Head of department – Doctor of Technical Sciences, Professor, Honored Worker of Education Vitaliy Lysenko

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**Training of masters of sciences  
in branch of knowledge "Electrical Engineering"  
in specialty 141 "POWER ENGINEERING, ELECTRICAL ENGINEERING  
AND ELECTRICAL MECHANICS"  
educational program "POWER ENGINEERING, ELECTRICAL ENGINEERING  
AND ELECTRICAL MECHANICS"**

Form of Training	Licensed number of persons:
– Full-time educational and professional program	150
– Full-time educational and research program	20
– Part-time	140
Duration of training:	
– Full-time educational and professional program	1 year 4 months
– Full-time educational and research program	1 year 10 months
– Part-time	1 year 4 months
Credits:	
– educational and professional program	90
– educational and research program	120
Qualification of graduates:	Master of power engineering, electrical engineering and electrical mechanics

**Training concept**

The educational-professional program is aimed at training professionals capable of designing, operating, ensuring a safety culture, performing installation, commissioning and repair, creating new equipment and implementing the latest technologies, carry out research and teaching.

**Areas of employment of graduates**

According to the current edition of the National Classification of Ukraine: Classifier of professions (DK 003: 2010) and International Standard Classification of Occupations 2008 (ISCO-08) graduate with professional qualification master's degree in "Electrical Power Engineering, Electrical Engineering and Electromechanics" may be employed in positions with the following professional title of work: 2143.2" Electrical Engineer in the energy sector ", "Energy Engineer".

**Practical training**

Mastering the program requires a mandatory condition of industrial production practices at the facilities of the power industry, industrial or agricultural enterprises.

**Proposed Topics of master's qualification thesis:**

1. Automated frequency-controlled asynchronous electric drive.
  2. Development and research of a feeding system with calf identification on a cattle fattening farm.
  3. Development and research of electrical equipment for repairs and post-repair tests of induction motors.
  4. Development of a set of measures for maintenance and diagnostics of consumer transformer substations.
  5. Improving the technological process of heat treatment of metal workpieces in a continuous induction heater.
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6. Improving the efficiency and reliability of power supply systems in the area of the 35/10 kV transformer substation.
7. Modernization of the 10 kV power transmission line with vacuum reclosers.
8. Improving maximum protection against short circuits in the electrical network with wind turbines.
9. Reconstruction of the settlement power supply system with the renewable energy sources.
10. Improving the algorithms of electricity storage for the operation of Smart Grid networks in the modes of the power supply daily cycle.

**Curriculum of Master training  
in educational program "Power engineering, electrical engineering  
and electrical mechanics"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Occupational safety in power plants	5	exam
CC 2	Energy security	5	exam
CC 3	Methodology and organization of scientific research with the basics of intellectual property	4	exam
CC 4	Business foreign language	5	exam
<b>Total</b>		<b>19</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to the preferences of students from the list of disciplines</b></i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 5	Electromagnetic compatibility	5	exam
CC 6	Mathematical methods of modelling and optimization in electrical engineering	8	exam
CC 7	Reliability of power systems	5	exam
CC 8	Intelligent control systems for electrical systems	4	
CC 9	Internet of things in energy consumption systems	5	exam
CC 10	Project management in the power industry	4	exam
CC 11	Electrotechnological complexes and systems	4	exam
CC 12	Production operational practice	8	
CC 13	Preparation and defense of master's thesis	4	
<b>Total</b>		<b>47</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to speciality</b></i>			
<i><b>Optional Block 1 "Electrical networks and systems"</b></i>			
OC 1.1	Functional intermetallics in power plants	4	exam
OC 1.2	Technical operation of electrical installations of power supply systems	4	exam
OC 1.3	Management of reliability and energy efficiency of electrical networks	4	exam
OC 1.4	Dispatching management of electric power systems	4	exam
<b>Total</b>		<b>16</b>	
<i><b>Optional Block 2 "Electromechanical devices and systems"</b></i>			
OC 2.1	Computer methods for calculating electromagnetic fields	4	exam



**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
OC 2.2	Intelligent electromechanical systems	4	exam
OC 2.3	Polyfunctional electromechanical converters of technological purpose	4	exam
OC 2.4	Energy efficiency management of electromechanical energy converters	4	exam
<b>Total</b>		<b>16</b>	
<i>Optional Block 3 "Electrical systems of distributed generation"</i>			
OC 3.1	Smart Grid technology in the power industry	4	exam
OC 3.2	Combined power supply systems	4	exam
OC 3.3	Smart Metering systems	4	exam
OC 3.4	Microprocessor protection systems and automation of distributed generation	4	exam
<b>Total</b>		<b>16</b>	
<i>Optional Block 4 "Electrical technologies in bioenergy systems"</i>			
OC 4.1	Theoretical foundations of bioenergy technologies	4	exam
OC 4.2	Electrical technologies in bioenergy systems of enterprises	4	exam
OC 4.3	Energy efficiency management of electrical equipment	4	exam
OC 4.4	Lighting installations and systems	4	exam
<b>Total</b>		<b>16</b>	
<i>Optional Block 5 "Energy management and audit"</i>			
OC 5.1	Energy management and energy audit	4	exam
OC 5.2	Automated energy control and accounting systems	4	exam
OC 5.3	Energy management design solutions	4	exam
OC 5.4	Electricity quality management	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of mandatory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of curriculum components**

**GENERAL TRAINING CYCLE  
Compulsory components of EPP**

**Occupational safety in power plants.** Protective measures in normal and emergency modes of electrical installations. Occupational safety during installation, repair and operation of electrical installations. Lightning protection of industrial and agricultural facilities.

**Energy security.** The main provisions of energy security of the state. Diversification of energy supply. Planning, organization and management at energy enterprises and in energy enterprises of industrial enterprises. The main directions of tariff formation in market conditions. Systems of planned and preventive repair of equipment. Energy consumption control. Energy balance. Rationing of fuel and energy resources. Energy consumption control systems. Energy saving measures.

**Methodology and organization of scientific research with the basics of intellectual property.** Formation of a system of knowledge on methodology, theory of method and research process, methodical support of research activity at stages of writing of master's work, formation of ability to organize scientific research of a certain problem with use of all complex of traditional methods of scientific researches, including general and special methods; modern concepts of scientific creativity, with the basics of the methodology of scientific knowledge and methods of scientific research, the development of abilities for self-education, the development of skills in the formation and use of a conscious methodological position of scientific research.

**Business Foreign Language.** The overall goal of the professional foreign language teaching program is to form students' professional language competencies, which will contribute to their effective functioning in the cultural diversity of the educational and professional environment. The method of searching for new information in foreign language sources, linguistic methods of analytical processing of foreign language sources are studied. Research of printed foreign language original literature and expansion of lexical and grammatical skills. Methods and linguistic features of annotation and abstracting of foreign language sources, bases of translation of professionally-oriented foreign language sources are studied.

### **CYCLE OF SPECIAL (PROFESSIONAL) TRAINING**

#### **Compulsory components of EPP**

**Electromagnetic compatibility.** Basic concepts of electromagnetic compatibility (EMC) and problems to be solved. Electromagnetic interference, their classification, characteristics. Ways of penetration of disturbances into the electrotechnical device. Sources of powerful periodic and impulse noise. Mechanisms of interference due to conductive (galvanic), capacitive, inductive connections. Influences through power circuits, on grounding circuits and common points. Influence between galvanically separated circuits and between circuits with common reference potential wire. Measures and methods to reduce impacts. Influences of electromagnetic fields on biological objects, normalization of these influences. The main components of protection against electromagnetic interference, characteristics and evaluation of their effectiveness (electromagnetic screens, filters, amplitude limiters). Devices for protection against impulse overvoltages in low voltage networks. Power line as a source of powerful interference. Providing EMC under the action of industrial periodic interference. Thunderstorm electromagnetic environment and internal lightning protection system. Zone concept of EMC support and its implementation.

**Mathematical methods of modeling and optimization in electrical engineering.** Basic definitions and concepts. Mathematical model, modeling, object, subject of research. Requirements to the model from the standpoint of the purpose and objectives of a particular study. Types of mathematical models. Modeling processes, their main stages: formulation and objectives of the study, construction of a mathematical model, development of algorithms and programs for limiting variables, verification of compliance and analysis of the results. Mathematical apparatus used to solve problems of electric power, electrical engineering and electromechanics: special computational methods, methods for solving algebraic and transcendental equations of one variable, methods for solving systems of linear and nonlinear finite equations and systems of differential equations in complete and partial derivatives, elements of similarity theory, set theory and graph theory. Delivery and solution of the problem of designing engineering objects in the field of electrical engineering, electromechanics and electrical technology according to search engine optimization algorithms, as well as providing students with skills in generating primary data for application of optimization methods and forming appropriate algorithms for finding optimal solutions for circuit design elements. objects.

**Reliability of power systems.** Theoretical bases of reliability and safety of electrotechnical systems, methods of ensuring reliability and safety of electrotechnical systems, methods of increase of reliability, estimation of reliability of electrotechnical systems by results of tests and operation, durability of electrical engineering, maintainability of electrical engineering, safety of electrical engineering, reliability of electrical systems technosphere, the main provisions of risk theory.

**Intelligent control systems for electrical systems.** Concepts of construction of automated electricity metering systems in the conditions of the energy market of Ukraine.

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Structures and features of construction and application of existing information and control systems and systems for electricity metering.

**Internet of things in energy consumption systems.** The discipline provides the formation of professional and special competencies for systematic structural and algorithmic analysis of electricity consumption using primary energy from several sources, acquisition of theoretical and practical skills in forming energy balances of local facilities and forecasting efficiency indicators in real time. Discrete and combinatorial mathematical modeling of power consumption systems with differentiated energy costs. Principles of structuring, decomposition, conveyorization in substantiation of structures and model series (capacities) of energy sources. Methods of synthesis of intelligent energy management systems. Internet of things architecture. Software and hardware complexes for the development of control systems based on the Internet of things.

**Project management in the power industry.** The discipline forms the necessary professional level of theoretical knowledge and practical skills of methodological bases and planning, management and making optimal design decisions in the power industry. As a result of studying the material, the future specialist will master the principles of project management at all stages of the life cycle.

**Electrotechnological complexes and systems.** Technical and economic bases of electrotechnological processes. Electric water heaters and steam boilers. Electrotechnological installations for creation of an optimum microclimate of rooms. Electrical equipment of protected soil structures. Electrotechnological equipment for drying, heat treatment and storage of agricultural products. Electrotechnological equipment of repair enterprises. Household electric heating devices.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1 "Electrical networks and systems"*

**Functional intermetallics in power plants.** The discipline belongs to the innovative direction of using alloys with the effect of shape memory (functional intermetallics) to increase the reliability and efficiency of power plants. Phenomenology and features of physical properties of functional intermetallics. Areas of use of the effects of shape memory and elasticity in the power industry. Reliability management of contact systems using functional intermetallics. Control of temperature modes of electrical installations. Thermoelectromechanical drives based on functional intermetallics. Modeling of parameters and characteristics of elements from functional intermetallics.

**Technical operation of electrical installations of power supply systems.** The main purpose of the discipline is to form in future professionals sustainable knowledge and skills in conducting and organizing the technical operation of electrical installations of power supply systems, maintaining the required level of their reliability and efficiency. Study of methods of control of a technical condition of electric installations, reception of experience of use of the control and measuring equipment for diagnostics of malfunctions, and also acquisition of skills of work with technical documentation.

**Management of reliability and energy efficiency of electrical networks.** The course studies two classes of problems to be solved based on reliability: analysis (evaluation) and synthesis (optimization) tasks. The tasks of the analysis include a quantitative assessment of the reliability of elements and systems, the reliability of electrical networks and consumer systems with known parameters, modes, configurations of electrical networks and systems. The tasks of the synthesis of reliability are the choice of rational solutions in the planning, design, construction and operation of power systems, as well as in the manufacture of equipment that provides the required level of reliability.

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**Dispatching management of electric power systems.** The discipline studies electric power industry as an object of automated control, normative support of switching in electrical installations, technology of operative switching in electric networks, operative-dispatching management in electric power, planning of power modes and mode management, dispatching services of electric power enterprises, automated system electricity metering.

*Optional Block 2 "Electromechanical devices and systems"*

**Computer methods for calculating electromagnetic fields.** Electromagnetic field as an object of modeling, the current state of modeling of electromagnetic fields, software packages for modeling electromagnetic devices by field theory, basics of modeling in COMSOL Multiphysics, trends in methods, techniques and tools for modeling electromechanical transducers by field theory.

**Intelligent electromechanical systems.** Microprocessors and microcomputers in electromechanical systems. Fundamentals of digital control of electromechanical systems. Z-transformation. Methods of analysis and synthesis. Electrical equipment and automation of intelligent electromechanical systems. Intelligent electromechanical systems of direct and alternating current. Modeling of intelligent electromechanical systems.

**Polyfunctional electromechanical converters for technological purposes.** Analysis of scientific and technical problems of creation of polyfunctional electromechanical converters (PEMP); basic principles of PEMP creation; generalized field-field mathematical model of interconnected electromagnetic, thermal and mechanical processes of PEMP; mathematical model of PEMP for optimization of energy conversion processes; energy analysis of the processes of interaction of PEMP and the working load-cooling medium with different rheological properties for a reasonable choice of mechanical and thermal loads of PEMP; methodology, development of algorithms and mathematical support of object-oriented design and optimization of PEMP; method of experimental determination of electromagnetic moment and PEMP parameters; methods and means of increasing the stability of PEMP in dynamic modes; theoretical substantiation of the process of formation and development of methods for experimental determination of the spectrum of higher harmonics of PEMP taking into account the temperature asymmetry of the hollow ferromagnetic rotor.

**Energy efficiency management of electromechanical energy converters.** Methods and structures of asynchronous electric drive, which increase the energy efficiency of machines and mechanisms that use electric drives, rational choice of electrical equipment of electric drives; reduction of losses in drive electric motors; reduction of losses in supply networks; transition from unregulated electric drive to regulated, choice of type and control structure of asynchronous electric drive, providing increase of energy efficiency and operational characteristics, methods and technical means of increase of energy efficiency of asynchronous electric drives due to choice of motors with high power characteristics. development of special algorithms active rectifiers.

*Optional Block 3 "Electrical systems of distributed generation"*

**Smart Grid technology in the power industry.** Consumer - an active participant in the electricity market, distributed generation, intelligent metering, new automation and control systems, demand management, digital substations. Within the study of the discipline, the current trends in world energy development, the main provisions and components of the modern concept of Smart Grid and the state of implementation of this concept in the leading countries of the world. Peculiarities of evolution of intelligent electric networks, perspective forms and directions of development of Smart Grid systems and technologies, their realization in Ukraine are presented.

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**Combined power consumption systems.** The main purpose of the discipline is the development of knowledge and skills of application of heterogeneous power sources, the establishment of relationships between the complex of autonomous and centralized power supply. Particular attention is paid to the study of the justification of the use of combined circuits with renewable power sources, the use of automatic redundancy schemes, methods of selection and coordination of parameters of power sources with power, the study of design features of power systems. All this makes it possible to prepare students for activities in the power services of enterprises in the formation and development of the energy market of Ukraine.

**Smart Metering Systems.** Intelligent electricity metering systems (Smart Metering). Technologies and equipment used to create intelligent electricity metering systems. Principles of organization and functional content of systems. Data transmission channels in accounting systems. Software for the operation of accounting systems. Cybersecurity of accounting systems.

**Microprocessor protection systems and automation of distributed generation.** Automatic control devices, emergency control and relay protection of scattered generation elements. Principles of operation, algorithms of operation, technical implementation, design and research of microprocessor automation and relay protection of distributed generation systems.

#### *Optional Block 4 "Electrical technologies in bioenergy systems"*

**Theoretical foundations of bioenergy technologies.** Bioenergy as an alternative energy industry, the primary nature of biomass energy, energy potential of biomass, environmental friendliness and efficiency of the bioenergy industry, prospects for the development of the bioenergy industry in the world and in Ukraine, types of biofuels and production technologies, biogas, biodiesel, bioalcohol.

**Electrical technologies in bioenergy systems of enterprises.** Influence of electric field and corona discharge field on bioenergy systems; application of direct current and industrial frequency current for influence on bioenergy systems, application of electrozonation, application of electromagnetic radiation (infrared and ultraviolet radiation, acoustic processing, application of microwave and HF energy), main directions of application of magnetic field in bioenergy systems.

**Energy efficiency management of electrical equipment.** General provisions of reliability and energy efficiency in electrotechnological complexes. The relevance of energy efficiency in Ukraine and the world. Methods for determining the reliability and energy efficiency in the production and provision of services in electrical systems. Fundamentals of energy audit of electrotechnological complexes, systems and objects of agro-industrial complex. Reliability and energy efficiency of water heaters and steam boilers. Reliability and energy efficiency of electrical installations to create an optimal microclimate of the premises. Reliability and energy efficiency of electrical equipment of protected soil structures. Reliability and energy efficiency of electrical equipment for drying, heat treatment and storage of agricultural products.

**Lighting installations and systems.** Acquaintance, study and use of modern achievements, innovative tendencies and directions of development in the field of lighting engineering. Study of modern lighting and irradiation systems based on energy efficient sources of optical radiation. Use of specialized computer programs for modeling and design of lighting, irradiation installations of external and internal lighting, and computer technologies with distributed systems of software and digital control of light sources for light-dynamic design of any objects. Introduction and study of modern computerized equipment for research of lighting installations and systems for various purposes. Design of modern automated lighting systems for various purposes.

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*Optional Block 5 "Energy management and audit"*

**Energy management and energy audit.** The main regulations governing the activities of auditors. Principles of energy auditing. Energy audit technologies. Audit requirements. Financial, energy and environmental audit. Audit tasks. Energy audit market participants. Typical object and energy audit. Classification of types of energy audit. Preliminary energy audit. Purposeful energy audit. Comprehensive energy audit. Basic principles of energy management. Classification of energy consumption norms. Specific energy costs. Methodological bases of planning and forecasting of energy resources costs. Strategic energy plan. Energy passport of the enterprise. Energy service companies.

**Automated energy control and accounting systems.** Basic principles of creating an automated energy metering system. Primary sensors and technical means of information transmission. The main software products for LOSOD maintenance. Software environment "Energy Center". ADAH software environment. Software environment "NovaSys. Advanced Metering Infrastructure ». Creating a system configuration. Survey of meters. Workstation energy. Formation of reporting channels. Creation, backup and transfer of databases to third parties. Report generation. Creating mnemonics for control points.

**Energy management design solutions.** Prospects and main directions of energy management in Ukraine and the world. The main problems and ways of energy management development in modern energy. Formation of energy supply strategies. Power supply and load management. Normalization of energy consumption. Methods for determining the norms of unit costs. Economic efficiency of energy saving management at the enterprise. The essence of the project, its conceptual level and tasks. Principled decisions, feasibility study. Composition and content of the project and working documentation. Determining the cost of construction. Regulatory framework and procedure for determining the cost of construction in Ukraine. Project examination.

**Electricity quality management.** Electricity quality indicators. Basic terms and definitions. State and international standards of electricity quality. Certification of electric energy. The impact of electricity quality on the work of consumers. Devices and means of measuring the quality of electricity. Energy management and control of electricity quality. Technical and organizational measures to ensure the quality of electricity. Compensation of higher harmonics. Reactive energy compensation. Technical means of voltage stabilization.

**Curriculum of Master training  
in educational program "Power engineering, electrical engineering  
and electrical mechanics"  
(educational and research program of master's training)**

Code n/a	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Amount of credits	Form final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 1	Occupational safety in power plants	5	exam
CC 2	Energy security	5	exam
CC 3	Methodology and organization of scientific research with the basics of intellectual property	4	exam
CC 4	Business foreign language	5	exam
<b>Total</b>		<b>19</b>	
<b>Optional components of ERP</b>			

**MASTER CURRICULA AND TRAINING PROGRAMS**

Code n/a	Components of the educational program (academic disciplines, course projects (works), practices, qualification work)	Amount of credits	Form final control
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 5	Electromagnetic compatibility	5	exam
CC 6	Mathematical methods of modelling and optimization in electrical engineering	8	exam
CC 7	Reliability of power systems	5	exam
CC 8	Intelligent control systems for electrical systems	4	
CC 9	Internet of things in energy consumption systems	5	exam
CC 10	Project management in the power industry	4	exam
CC 11	Electrotechnological complexes and systems	4	exam
CC 12	Production operational practice	8	
CC 13	Preparation and defense of master's qualification thesis	4	
<b>Total</b>		<b>47</b>	
<b>Optional components of ERP</b>			
<b>Free choice according to speciality</b>			
<i>Optional Block 1 "Electrical networks and systems"</i>			
OC 1.1	Functional intermetallics in power plants	4	exam
OC 1.2	Technical operation of electrical installations of power supply systems	4	exam
OC 1.3	Management of reliability and energy efficiency of electrical networks	4	exam
OC 1.4	Dispatching management of electric power systems	4	exam
OC 1.5	Methods for optimizing the modes of power systems	4	exam
OC 1.6	Artificial intelligence in power systems	4	exam
OC 1.7	Monitoring and control of electrical systems	4	exam
OC 1.8	Stability of power systems	4	exam
<b>Total</b>		<b>32</b>	
<i>Optional Block 2 "Electromechanical devices and systems"</i>			
OC 2.1	Computer methods for calculating electromagnetic fields	4	exam
OC 2.2	Intelligent electromechanical systems	4	exam
OC 2.3	Polyfunctional electromechanical converters for technological purposes	4	exam
OC 2.4	Energy efficiency management of electromechanical energy converters	4	exam
OC 2.5	Heuristic and approximation modeling in power engineering	4	exam
OC 2.6	Mathematical modeling of electromechanical energy converters	4	exam
OC 2.7	Synthesis of electromagnetic systems	4	exam
OC 2.8	Visualization and processing of experimental studies	4	exam
<b>Total</b>		<b>32</b>	
<b>The total amount of compulsory components</b>		<b>80</b>	
<b>The total amount of optional components</b>		<b>40</b>	
<b>THE TOTAL AMOUNT OF ERP</b>		<b>120</b>	

**Annotations of curriculum components**

**GENERAL TRAINING CYCLE**

**Compulsory components of ERP**

**Occupational safety in power plants.** Protective measures in normal and emergency modes of electrical installations. Occupational safety during installation, repair

and operation of electrical installations. Lightning protection of industrial and agricultural facilities.

**Energy security.** The main provisions of energy security of the state. Diversification of energy supply. Planning, organization and management at energy enterprises and in energy enterprises of industrial enterprises. The main directions of tariff formation in market conditions. Systems of planned and preventive repair of equipment. Energy consumption control. Energy balance. Rationing of fuel and energy resources. Energy consumption control systems. Energy saving measures.

**Methodology and organization of scientific research with the basics of intellectual property.** Formation of a system of knowledge on methodology, theory of method and research process, methodical support of research activity at stages of writing of master's work, formation of ability to organize scientific research of a certain problem with use of all complex of traditional methods of scientific researches, including general and special methods; modern concepts of scientific creativity, with the basics of the methodology of scientific knowledge and methods of scientific research, the development of abilities for self-education, the development of skills in the formation and use of a conscious methodological position of scientific research.

**Business Foreign Language.** The overall goal of the professional foreign language teaching program is to form students' professional language competencies, which will contribute to their effective functioning in the cultural diversity of the educational and professional environment. The method of searching for new information in foreign language sources, linguistic methods of analytical processing of foreign language sources are studied. Research of printed foreign language original literature and expansion of lexical and grammatical skills. Methods and linguistic features of annotation and abstracting of foreign language sources, bases of translation of professionally-oriented foreign language sources are studied.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of ERP**

**Electromagnetic compatibility.** Basic concepts of electromagnetic compatibility (EMC) and problems to be solved. Electromagnetic interference, their classification, characteristics. Ways of penetration of disturbances into the electrotechnical device. Sources of powerful periodic and impulse noise. Mechanisms of interference due to conductive (galvanic), capacitive, inductive connections. Influences through power circuits, on grounding circuits and common points. Influence between galvanically separated circuits and between circuits with common reference potential wire. Measures and methods to reduce impacts. Influences of electromagnetic fields on biological objects, normalization of these influences. The main components of protection against electromagnetic interference, characteristics and evaluation of their effectiveness (electromagnetic screens, filters, amplitude limiters). Devices for protection against impulse overvoltages in low voltage networks. Power line as a source of powerful interference. Providing EMC under the action of industrial periodic interference. Thunderstorm electromagnetic environment and internal lightning protection system. Zone concept of EMC support and its implementation.

**Mathematical methods of modeling and optimization in electrical engineering.** Basic definitions and concepts. Mathematical model, modeling, object, subject of research. Requirements to the model from the standpoint of the purpose and objectives of a particular study. Types of mathematical models. Modeling processes, their main stages: formulation and objectives of the study, construction of a mathematical model, development of algorithms and programs for limiting variables, verification of compliance and analysis of the results. Mathematical apparatus used to solve problems of electric

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power, electrical engineering and electromechanics: special computational methods, methods for solving algebraic and transcendental equations of one variable, methods for solving systems of linear and nonlinear finite equations and systems of differential equations in complete and partial derivatives, elements of similarity theory, set theory and graph theory. Delivery and solution of the problem of designing engineering objects in the field of electrical engineering, electromechanics and electrical technology according to search engine optimization algorithms, as well as providing students with skills in generating primary data for application of optimization methods and forming appropriate algorithms for finding optimal solutions for circuit design elements. objects.

**Reliability of power systems.** Theoretical bases of reliability and safety of electrotechnical systems, methods of ensuring reliability and safety of electrotechnical systems, methods of increase of reliability, estimation of reliability of electrotechnical systems by results of tests and operation, durability of electrical engineering, maintainability of electrical engineering, safety of electrical engineering, reliability of electrical systems technosphere, the main provisions of risk theory.

**Intelligent control systems for electrical systems.** Concepts of construction of automated electricity metering systems in the conditions of the energy market of Ukraine. Structures and features of construction and application of existing information and control systems and systems for electricity metering.

**Internet of things in energy consumption systems.** The discipline provides the formation of professional and special competencies for systematic structural and algorithmic analysis of electricity consumption using primary energy from several sources, acquisition of theoretical and practical skills in forming energy balances of local facilities and forecasting efficiency indicators in real time. Discrete and combinatorial mathematical modeling of power consumption systems with differentiated energy costs. Principles of structuring, decomposition, conveyorization in substantiation of structures and model series (capacities) of energy sources. Methods of synthesis of intelligent energy management systems. Internet of things architecture. Software and hardware complexes for the development of control systems based on the Internet of things.

**Project management in the power industry.** The discipline forms the necessary professional level of theoretical knowledge and practical skills of methodological bases and planning, management and making optimal design decisions in the power industry. As a result of studying the material, the future specialist will master the principles of project management at all stages of the life cycle.

**Electrotechnological complexes and systems.** Technical and economic bases of electrotechnological processes. Electric water heaters and steam boilers. Electrotechnological installations for creation of an optimum microclimate of rooms. Electrical equipment of protected soil structures. Electrotechnological equipment for drying, heat treatment and storage of agricultural products. Electrotechnological equipment of repair enterprises. Household electric heating devices.

### **Optional components of ERP**

#### ***Free choice according to specialty***

#### *Optional Block 1 "Electrical networks and systems"*

**Functional intermetallics in power plants.** The discipline refers to the innovative direction of using alloys with the effect of shape memory (functional intermetallics) to increase the reliability and efficiency of power plants. Phenomenology and features of physical properties of functional intermetallics. Areas of use of the effects of shape memory and elasticity in the power industry. Reliability management of contact systems using functional intermetallics. Control of temperature modes of electrical installations.

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Thermoelectromechanical drives based on functional intermetallics. Modeling of parameters and characteristics of elements from functional intermetallics.

**Technical operation of electrical installations of power supply systems.** The main purpose of the discipline is to form in future professionals sustainable knowledge and skills in conducting and organizing the technical operation of electrical installations of power supply systems, maintaining the required level of their reliability and efficiency. Study of methods of control of a technical condition of electric installations, reception of experience of use of the control and measuring equipment for diagnostics of malfunctions, and also acquisition of skills of work with technical documentation.

**Management of reliability and energy efficiency of electrical networks.** The course examines two classes of problems to be solved based on reliability: analysis (evaluation) and synthesis (optimization). The tasks of the analysis include a quantitative assessment of the reliability of elements and systems, the reliability of electrical networks and consumer systems with known parameters, modes, configurations of electrical networks and systems. The tasks of reliability synthesis are the choice of rational solutions in the planning, design, construction and operation of power systems, as well as in the manufacture of equipment that provides the required level of reliability.

**Dispatching management of electric power systems.** The discipline studies electric power industry as an object of automated control, normative support of switching in electrical installations, technology of operative switching in electric networks, operative-dispatching management in electric power, planning of power modes and mode management, dispatching services of electric power enterprises, automated system electricity metering.

**Methods for optimizing the modes of power systems.** General information about power systems and their modes, optimal modes of power systems, optimization of long-term modes of power systems, optimization methods (classical optimization methods without restrictions, Lagrange method, functions of one variable, functions of many variables, gradient methods, optimization methods in the presence of restrictions, basics of penalty method functions), basics of multicriteria optimization of modes, multi-purpose complex optimization of modes of power systems, optimization of modes of power supply (problems of optimization of quality of the electric power, problems of optimum compensation of reactive power, problems of optimization of power consumption in the conditions of power deficit).

**Artificial intelligence in power systems.** The concept of artificial intelligence in the problems of energy management. Possibilities of different types of artificial intelligence (neural networks, phase logic, structural information method). Implementation of concepts of electric power development on the basis of artificial intelligence. Study of artificial intelligence modeling packages in matlab (streetflow, fuzzy logic, neural networks, signal information processing, communication systems and others). Methods of pattern recognition in static and dynamic electric power objects. Methods of teaching artificial intelligence algorithms. Built-in expert systems. Algorithms for automatic signal processing of alarm files of registrars in networks. Hierarchical levels of information processing in the power system. Methods of signal and semantic filtering of transient signals in the network.

**Monitoring and control of electrical systems.** Monitoring systems and determination of vector parameters of electrical systems. Method of functional modeling and hierarchical models for calculations of steady modes. Estimation of dynamics of electric power systems. Fundamentals of control of electrical systems.

**Stability of power systems.** Ensuring normal stable operation of the power supply system in case of any violations of its modes; mastering the processes occurring in synchronous generators of stations and in networks of electrical systems; study of electromechanical transients in electrical systems, both for large and small perturbations;

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ensuring static stability of the electrical system; ensuring the dynamic stability of the electrical system; analysis and ensuring the stability of load nodes in both small and large disturbances; study of the causes of asynchronous modes in electrical systems and methods of their elimination; analysis of measures to improve the sustainability and quality of transition processes.

*Optional Block 2 "Electromechanical devices and systems"*

**Computer methods for calculating electromagnetic fields.** Electromagnetic field as an object of modeling, the current state of modeling of electromagnetic fields, software packages for modeling electromagnetic devices by field theory, basics of modeling in COMSOL Multiphysics, trends in methods, techniques and tools for modeling electromechanical transducers by field theory.

**Intelligent electromechanical systems.** Microprocessors and microcomputers in electromechanical systems. Fundamentals of digital control of electromechanical systems. Z-transformation. Methods of analysis and synthesis. Electrical equipment and automation of intelligent electromechanical systems. Intelligent electromechanical systems of direct and alternating current. Modeling of intelligent electromechanical systems.

**Polyfunctional electromechanical converters of technological purpose.** Analysis of scientific and technical problems of creation of polyfunctional electromechanical converters (PEMP); basic principles of PEMP creation; generalized field-field mathematical model of interconnected electromagnetic, thermal and mechanical processes of PEMP; mathematical model of PEMP for optimization of energy conversion processes; energy analysis of the processes of interaction of PEMP and the working load-cooling medium with different rheological properties for a reasonable choice of mechanical and thermal loads of PEMP; methodology, development of algorithms and mathematical support of object-oriented design and optimization of PEMP; method of experimental determination of electromagnetic moment and PEMP parameters; methods and means of increasing the stability of PEMP in dynamic modes; theoretical substantiation of the process of formation and development of methods for experimental determination of the spectrum of higher harmonics of PEMP taking into account the temperature asymmetry of the hollow ferromagnetic rotor.

**Energy efficiency management of electromechanical energy converters.** Methods and structures of asynchronous electric drive, which increase the energy efficiency of machines and mechanisms that use electric drives, rational choice of electrical equipment of electric drives; reduction of losses in driving electric motors; reduction of losses in supply networks; transition from unregulated electric drive to regulated, choice of type and control structure of asynchronous electric drive, providing increase of energy efficiency and operational characteristics, methods and technical means of increase of energy efficiency of asynchronous electric drives due to choice of motors with high energy characteristics. active rectifiers.

**Heuristic and approximation modeling in power engineering.** Heuristic and approximation models in engineering practice, heuristic and approximation models of the stage of formation of technical characteristics and indicators of the object, heuristic and approximation models of the design stage, heuristic models and algorithms of the operation stage, diagnostic concepts, invariant to the object structure, models and algorithms based on simulations of natural processes and phenomena, functional and approximation models based on artificial neural networks.

**Mathematical modeling of electromechanical energy converters.** Methods of mathematical description and modeling of electromechanical energy conversion processes, principles of calculation of static and dynamic characteristics of electromechanical systems.

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**Synthesis of electromagnetic systems.** Mathematical apparatus for the synthesis of magnetic systems. Synthesis of magnetic systems with sources at the boundary of the field of field. Synthesis of magnetic systems with sources located in the field of the field. Reduction of problems of synthesis of magnetic systems to SLAR. Solving problems of synthesis of magnetic systems by the method of decomposition of a given field by a nonorthogonal system of functions. Synthesis of magnetic systems with permanent magnets. Systems for pre-sowing treatment of seed material in a magnetic field.

**Visualization and processing of experimental studies.** Statistical processing of experimental results, calculation of errors, visualization of experimental results, 2D and 3D graphics, computer programs for processing and presentation of experimental data.

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**Training of masters of sciences  
in branch of knowledge "Automation and Instrumentation"  
in specialty 151 "AUTOMATION AND COMPUTER INTEGRATED TECHNOLOGIES"  
educational program "AUTOMATION AND COMPUTER INTEGRATED  
TECHNOLOGIES"**

Form of Training:	Licensed number of persons:
– Full-time	35
Duration of training:	
– Full-time educational and professional program	1 year 4 months
– Full-time educational and research program	1 year 10 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
– educational and research program	120
Language	Ukrainian, English
Qualification of graduates:	research engineer of computer systems and automatics

**The concept of training**

Educational activities while ensuring fulfillment of state orders and other agreements with legal entities and individuals for training specialists with higher education is carried out in accordance with state standards of higher education. Courses in the Institute of Energy, automation and energy saving based on a systems approach between the objective and principles of learning to educate students broadmindedness non-standard thinking, overhead and ability to solve social and economic problems in their relationship and to meet the needs of modern production and con 'situation on the labor market.

An integral part of the educational activity is an educational process that involves the education of future professionals in the best traditions of national and world culture taking into account the human priorities, Recovery and development of the national economy, culture, science, spiritual unity of the nation and the people of Ukraine.

**Educational and professional program of master's training**

***Optional Block "Computer-Integrated Process Control Systems  
and production"***

Research, development and implementation of computer integrated control systems in animal husbandry and crop production. Technology and mathematical modeling of processes in livestock, automated process control systems in animal husbandry and crop production.

**Areas of employment for graduates**

Engineer CEA poultry, engineer of APCS livestock complex, engineer maintenance of automation systems in the enterprise, engineer Department APCS greenhouses, Engineer CEA greenhouses.

***Optional Block "Internet of Things"***

Research, development of software and hardware systems and computer intelligent systems of the Internet of Things. The software of the Internet of Things, features of

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programming of the Internet of things, features of development of the software for a network exchange, protocols of wireless network exchange of management of devices of the "Internet of Things" are considered, operating systems for Internet of Things, low-level and high-level software development languages, cloud services, information security of the Internet of Things.

#### **Areas of employment for graduates**

Engineer ACS in the IT department of companies in various fields, where it is necessary to combine information systems and control system to obtain operational results.

#### **Educational and research program of master's training**

##### ***Optional Block "Energy Efficient Control Systems of Biotechnological Objects"***

Research and development of advanced energy efficiency control systems of biotechnical objects. Technology and mathematical modeling of processes in the areas of agriculture, automated process control system in agriculture.

#### **Areas of employment for graduates**

Engineer of automated control systems, research engineer of research institutions, research associate of research institutions.

#### **Practical training**

Practical training is carried out in educational and research facilities of the university: Separated subdivision of NULES of Ukraine "Velykosnytynske Education and Research Farm named after O. Muzychenka", Separated subdivision of NULES of Ukraine "Agronomic Research Station", Separated subdivision of NULES of Ukraine "Education and Research Farm "Vorzel", Separated subdivision of NULES of Ukraine "Boyarka Forestry Research Station", LTD "Kyiv Poultry", PC "Kombinat "Teplychniy", State Enterprise "Puscha Vodytsia", PC "Terezyne", Company Group "Veres".

#### **Proposed Topics of master's qualification thesis:**

1. The use of fuzzy logic in automated control system of temperature regime in the poultry house with keeping laying hens in the winter.
  2. Neural networks in SAR bound control temperature and humidity in the greenhouse.
  3. Intelligent control system of microclimate in a growth chamber mushrooms and its temperature compost research.
  4. Intelligent control system of microclimate in the vegetable store and its humidity research.
  5. The use of fuzzy logic in automated control system of greenhouse temperature.
  6. Neural networks in ACS bound control temperature in the poultry house considering CO<sub>2</sub> concentrations.
  7. Intelligent thermal control system in the poultry house using the optimal control algorithm.
  8. The use of fuzzy logic in automated control system of temperature regime in winter greenhouses considering external influences.
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**Curriculum of Master training  
in educational program "Automation and computer integrated technologies"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1.	Agricultural Policy	4	exam
CC 2.	Business Foreign Language	4	exam
CC 3.	Special Sections of High Mathematics	4	exam
CC 4.	Calculations of economic efficiency of scientific developments	4	exam
CC 5.	Safety in the Area	4	exam
<b>Optional components of ERP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6.	Automated Accounting of Energy and Material Resources	4	exam
CC 7.	Features of computer modeling of systems of automation of biotechnical objects	4	exam
CC 8.	Automation of biotechnical objects: automated process control systems	4	exam
CC 9.	Computer aided design systems for automation of biotechnical objects	4	exam
CC 10.	Installation, adjustment and operation of automation systems of biotechnical objects	4	exam
CC 11.	Artificial intelligence in automation systems of biotechnical objects	4	exam
CC 12.	Robotic Complex and Systems	4	exam
CC 13.	Practical Training	10	exam
CC 14.	Preparation and defense of master's qualification thesis	4	Protection of qualification work
<b>Optional components of EPP</b>			
<b><i>Free choice according to speciality</i></b>			
<b><i>Optional Block 1 "Computer-Integrated Process Control Systems and production"</i></b>			
OC 1.1	World experience of methods and means of modern automated process control	4	test
OC 1.2	Features of modeling of computer-integrated systems of automation of biotechnical objects	4	test
OC 1.3	Modeling and Identification of Biotechnical Objects in Agriculture	4	test
OC 1.4	Protection of information in automation systems	4	test
<b><i>Optional Block 2 "Internet of Things"</i></b>			
OC 2.1	Design of Internet systems of Things	4	test
OC 2.2	Cloudy Technology	4	test
OC 2.3	Maintenance of the Internet of Things	4	test
OC 2.4	Internet of Things programming	4	test
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	



## Annotations of subjects in the curriculum

### GENERAL TRAINING CYCLE Compulsory components of EPP

**Business foreign language.** The general aim of the program of teaching of foreign language for the professional purpose is formation students' professional linguistic competencies that will contribute to their efficient operating in cultural variety of training and professional environment. The methods of search of new information in another language sources, linguistic methods of analytical study of another language sources are learned. Students study published original literature in another language and increase their lexical and grammatical skills. Methods and linguistic peculiarities of annotation and synopsis of another language sources, the principles of translation of professional oriented another language sources are studied.

**Agrarian policy.** The discipline introduces the principles of formation of policy in agrarian sphere, gives the possibility to gain proficiency in methodical and methodological principles of the development and realization of the complex of actions concerning support and provision of the development of agriculture in the system of inter-branch links in national economy as well as estimate from the theoretic position practical actions of state structures concerning regulation of the agricultural production of the country.

Both national and foreign experience is studied. In case of mastering the material students get the possibility to form their own view on professional base about processes and phenomena happening in agrarian sector of the state economy.

**Special Sections of High Mathematics.** The main sections of high mathematics needed for research and development of electro-technologies in agriculture. Mathematical methods for solving linear and nonlinear differential equations. Matrix, operating methods. Functional series. Basic theory of random functions.

**Calculations of economic efficiency of scientific developments.** The feasibility of implementing scientific developments needs the calculation of economic efficiency, which should be evaluated from different perspectives. Varieties of techniques in different conditions are offered. The basis of the discipline is estimation calculations, the risks and feasibility of projects. Statistical methods, methods of expert analysis and calculations of investments are proposed.

**Safety in the Area.** Safety measures in normal and emergency modes of electrical installations. Safety during installation, repair and maintenance of electrical installations. Lightning agricultural facilities.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Automated Accounting of Energy and Material Resources.** Concepts and Models: object, class, data, methods, access inheritance properties. Systems of objects and classes. Designing object-oriented programs: methods and algorithms. Object-oriented languages, classification, architecture, expressive means, technology application. Interface: The rules of the organization, methods and programming tools. Object-oriented systems, methods, language and methods of programming

**Features of computer modeling of systems of automation of biotechnical objects.** Methods of computer-modeling systems (KMS). Structure and function of KMS. Gathering and processing information. Mathematical modeling. Algorithms of optimal and adaptive management. Implementation of control functions. Examples KMS in agriculture.

**Automation of biotechnical objects: automation of technological processes.** Specifications processes as facilities management and their disturbances. Principles of

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automated process control systems. Automation of technological processes in crop and livestock production. Information channels and their characteristics. Identification of control objects. Algorithms management. Technical means of automation. Reliability and economic efficiency of automation.

**Computer aided design systems for automation of biotechnical objects.** Basic concepts and definitions. Basic concepts of electrification systems and process automation. General information about agricultural processes. Technical support of CAD. Software of CAD. Databases of CAD. Statistics and dynamics of technological objects control. Regulatory impact and organs. Automation of technological devices.

**Installation, adjustment and operation of automation systems of biotechnical objects.** Installation of automation circuits. Operation of equipment automation systems. Adjustment of sensors, controllers, actuators of automated control systems. The procedure for putting into operation mounted systems. Formation and organization of instrumentation and automation means in agricultural enterprise.

**Artificial intelligence in automation systems of biotechnical objects.** Basic concepts of neural networks. The properties of the neural network training. Hopfield neural networks. Basic concepts of fuzzy logic. fuzzy sets and fuzzy neural networks.

**Robotic Complex and Systems.** Design and simulation tasks, principles, algorithms control robotic systems and systems. Appointment, classification and objectives robotic control systems. Structure, key components of robotic control systems. Intelligent robotic systems. The system of perception and recognition information. Keeping system knowledge, problem solving and forming control actions. The system of environmental impact. Principles of robots and robotic systems. System design, manufacturing, robotics control systems. Possibilities of robots and robotic systems in the agro-industrial complex.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1 "Computer-Integrated Process Control Systems and production"*

**World experience of methods and means of modern automated process control.** Modeling of technical and biological objects under uncertainty: Kharkiv random processes. Statistical modeling of random processes. Decision making under uncertainty using gaming techniques. Creating and working databases. Software. Technical support of intelligent systems.

**Features of modeling of computer-integrated systems of automation of biotechnical objects.** Principles of construction of control system. Information channels and their characteristics. Identification of facilities management. Algorithms management. Technical means of control system. Reliability and economic efficiency of control system.

**Modeling and Identification of Biotechnical Objects in Agriculture.** A classification of technological processes and objects of automatic control. Methods of constructing static and dynamic objects agricultural processes and industries.

**Protection of information in automation systems.** The basic concepts of information protection in automation systems, principles of construction of complex information protection systems are considered, typical vulnerabilities of systems are noted, the analysis of systems for security is carried out and normative documents of information protection in automation systems are defined. Legal, organizational and technical methods of information protection are determined. This provides an opportunity to gain practical skills in the application of modern technologies for information security in automation systems.

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*Optional Block 2 «Internet of Things»*

**Design of Internet systems of Things.** Regulatory documents for the design of the Internet of Things are considered, the structure of the Internet of Things is analyzed, an algorithm for the operation and programming of devices is developed, an algorithm for information exchange, protocols for the implementation of connections between devices and their programming environment are described. The choice of Internet of things according to the technical characteristics is made taking into account the operating conditions. Technical is implemented on the basis of simulation software and using a set of technical means Arduino, Raspberry, Schneider, ARIES.

**Cloudy Technology.** Basic information on the emergence, development and use of cloud technologies, typologies of cloud resource deployment (private, public, hybrid, public, etc.) is considered. Methods and features of designing cloud services, advantages and disadvantages of cloud computing models and solutions based on them are studied. You get the skills to develop applications for major platforms. The expediency of transferring existing applications to the cloud environment is determined, the efficiency of application and long-term prospects are assessed. Issues of security, deployment, backup in the context of cloud infrastructure are considered. An overview of current solutions of cloud computing market leaders (Amazon, Microsoft and Google, etc.).

**Maintenance of the Internet of Things.** The architecture of the Internet of Things is analyzed, the technical means used for its implementation, their structure, the principle of operation and software for debugging are given. Particular attention is paid to network devices, their configuration to provide communication with the global network.

**Internet of Things programming.** Development of software and hardware systems and computer intelligent systems of the Internet of Things. The software of the Internet of Things, features of programming of the Internet of things, features of development of the software for a network exchange, protocols of wireless network exchange of management of devices of the "Internet of Things" are considered; operating systems for Internet of Things; low-level and high-level software development languages (C ++, C #, Java and others); cloud services, information security of the Internet of Things; software documentation requirements.

**Curriculum of Master training  
in educational program "Automation and computer integrated technologies"  
(educational and research program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 1.	Agricultural Policy	4	exam
CC 2.	Business Foreign Language	4	exam
CC 3.	Special Sections of High Mathematics	4	exam
CC 4.	Calculations of economic efficiency of scientific developments	4	exam
CC 5.	Safety in the Area	4	exam
CC 6	Methodology and Organization of Scientific Research on the Basics of Intellectual Property	4	exam
<b>Optional components of ERP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>Compulsory components of ERP</b>			
CC 7.	Automated Accounting of Energy and Material Resources	4	exam
CC 8.	Features of computer modeling of systems of automation of biotechnical objects	4	exam
CC 9.	Automation of biotechnical objects: automated process control systems	4	exam
CC 10.	Computer aided design systems for automation of biotechnical objects	4	exam
CC 11.	Installation, adjustment and operation of automation systems of biotechnical objects	4	exam
CC 12.	Artificial intelligence in automation systems of biotechnical objects	4	exam
CC 13.	Robotic Complex and Systems	4	exam
CC 14.	Intelligent Control Systems of Biotechnical Objects	10	exam
CC 15.	Protection of information in automation systems	4	exam
CC 16.	Practical Training	13	exam
CC 17.	Preparation and defense of master's qualification thesis	4	Protection of qualification work
<b>Optional components of ERP</b>			
<b>Free choice according to speciality</b>			
<i>Optional Block "Energy Efficient Control Systems of Biotechnological Objects"</i>			
OC 1.	World experience of methods and means of modern automated process control	4	test
OC 2.	Special Systems	4	test
OC 3.	Methods for Preparing Research	4	test
OC 4.	Modeling and Identification of Biotechnical Objects in Agriculture	4	test
OC 5.	Computer Integrated Control Systems	4	test
OC 6.	Cloudy Technology	4	test
OC 7.	Internet of Things programming	4	test
<b>The total amount of compulsory components</b>		<b>88</b>	
<b>The total amount of optional components</b>		<b>32</b>	
<b>THE TOTAL AMOUNT OF ERP</b>		<b>120</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of ERP

**Business foreign language.** The general aim of the program of teaching of foreign language for the professional purpose is formation students' professional linguistic competencies that will contribute to their efficient operating in cultural variety of training and professional environment. The methods of search of new information in another language sources, linguistic methods of analytical study of another language sources are learned. Students study published original literature in another language and increase their lexical and grammatical skills. Methods and linguistic peculiarities of annotation and synopsis of another language sources, the principles of translation of professional oriented another language sources are studied.

**Agrarian policy.** The discipline introduces the principles of formation of policy in agrarian sphere, gives the possibility to gain proficiency in methodical and methodological principles of the development and realization of the complex of actions concerning support and provision of the development of agriculture in the system of inter-branch links in national economy as well as estimate from the theoretic position practical actions of state

structures concerning regulation of the agricultural production of the country.

Both national and foreign experience is studied. In case of mastering the material students get the possibility to form their own view on professional base about processes and phenomena happening in agrarian sector of the state economy.

**Special Sections of High Mathematics.** The main sections of high mathematics needed for research and development of electro-technologies in agriculture. Mathematical methods for solving linear and nonlinear differential equations. Matrix, operating methods. Functional series. Basic theory of random functions.

**Calculations of economic efficiency of scientific developments.** The feasibility of implementing scientific developments needs the calculation of economic efficiency, which should be evaluated from different perspectives. Varieties of techniques in different conditions are offered. The basis of the discipline is estimation calculations, the risks and feasibility of projects. Statistical methods, methods of expert analysis and calculations of investments are proposed.

**Safety in the Area.** Safety measures in normal and emergency modes of electrical installations. Safety during installation, repair and maintenance of electrical installations. Lightning agricultural facilities.

**Methodology and organization of research with the principles of intellectual property.** The aim of the discipline is formation of the system of knowledge in methodology, theory of method and research process, methodical support of scientific and research activity at the stages of preparation of a Master paper, formation of the ability to organize research of a specific issue using the whole complex of the traditional methods of research including general and special methods. The main task of the theoretical part of the course is introduction to students the current concepts of research creation, the principles of methodology of scientific perception and methods of research. The main task of the practical part is the development of self-education ability, mastering skills of formation and application of perceived methodological position of research. In case of mastering the course students have to improve their skills of search, assortment and processing of scientific information, accurate formulation of a problem, aim, task, object, subject, methods of research. Introduction to students the principles of intellectual property and direction of them to gain knowledge and skills concerning registration of rights of ownership, their protection, commercialization, estimation and management are envisaged.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of ERP**

**Automated Accounting of Energy and Material Resources.** Concepts and Models: object, class, data, methods, access inheritance properties. Systems of objects and classes. Designing object-oriented programs: methods and algorithms. Object-oriented languages, classification, architecture, expressive means, technology application. Interface: The rules of the organization, methods and programming tools. Object-oriented systems, methods, language and methods of programming

**Features of computer modeling of systems of automation of biotechnical objects.** Methods of computer-modeling systems (KMS). Structure and function of KMS. Gathering and processing information. Mathematical modeling. Algorithms of optimal and adaptive management. Implementation of control functions. Examples KMS in agriculture.

**Automation of biotechnical objects: automated process control systems.** Principles of control systems. Information channels and their characteristics. Identification of control objects. Algorithms management. Technical means of automation. Reliability and economic efficiency of automation. Specifications processes as facilities management

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and their disturbances. Principles of automated process control systems. Automation of technological processes in crop and livestock production.

**Computer aided design systems for automation of biotechnical objects.** Basic concepts and definitions. Basic concepts of electrification systems and process automation. General information about agricultural processes. Technical support of CAD. Software of CAD. Databases of CAD. Statistics and dynamics of technological objects control. Regulatory impact and organs. Automation of technological devices.

**Installation, adjustment and operation of automation systems of biotechnical objects.** Installation of automation circuits. Operation of equipment automation systems. Adjustment of sensors, controllers, actuators of automated control systems. The procedure for putting into operation mounted systems. Formation and organization of instrumentation and automation means in agricultural enterprise.

**Artificial intelligence in automation systems of biotechnical objects.** Basic concepts of neural networks. The properties of the neural network training. Hopfield neural networks. Basic concepts of fuzzy logic. fuzzy sets and fuzzy neural networks.

**Robotic Complex and Systems.** Design and simulation tasks, principles, algorithms control robotic systems and systems. Appointment, classification and objectives robotic control systems. Structure, key components of robotic control systems. Intelligent robotic systems. The system of perception and recognition information. Keeping system knowledge, problem solving and forming control actions. The system of environmental impact. Principles of robots and robotic systems. System design, manufacturing, robotics control systems. Possibilities of robots and robotic systems in the agro-industrial complex.

**Intelligent Control Systems of Biotechnical Objects.** Classification of types of intelligent systems. Presentation specialized development environments Intelligent Systems. Basic concepts of neural networks. Classification of neural networks and their properties. The properties of the neural network training. Neural networks counter-proliferation. Hopfield neural networks. The neural network Hemet. Basic concepts of fuzzy logic. The theoretical basis of fuzzy logic. Fuzzy sets. Fuzzy operation. Algorithm of fuzzy inference systems. Fuzzy sets and fuzzy neural network. Basic concepts of genetic algorithm.

**Protection of information in automation systems.** The basic concepts of information protection in automation systems, principles of construction of complex information protection systems are considered, typical vulnerabilities of systems are noted, the analysis of systems for security is carried out and normative documents of information protection in automation systems are defined. Legal, organizational and technical methods of information protection are determined. This provides an opportunity to gain practical skills in the application of modern technologies for information security in automation systems.

### **Optional components of ERP**

#### ***Free choice according to specialty***

##### *Optional Block 1 "Computer-Integrated Process Control Systems and production"*

**World experience of methods and means of modern automated process control.** Modeling of technical and biological objects under uncertainty: Kharkiv random processes. Statistical modeling of random processes. Decision making under uncertainty using gaming techniques. Creating and working databases. Software. Technical support of intelligent systems.

**Modeling and Identification of Biotechnical Objects in Agriculture.** A classification of technological processes and objects of automatic control. Methods of constructing static and dynamic objects agricultural processes and industries.

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**Special Systems.** Special subjects in the study which students have to study methods of creating, optimizing adaptive control systems, control systems built on fuzzy logic. Creation of research systems, their configuration and optimization must take place in an environment in MatLAB Packages Simulink and Fuzzy Logis. Also laid the foundations of genetic learning of neural networks is the basis for building intelligent controllers.

**Methods for Preparing Research.** Within the course presents the main stages of scientific research of the problem of system-analytical position and generalized requirements for methods of materials processing research. Lecture and laboratory practical course material covers the entire range of the materials for their research publications in general and, in particular, consider writing the competent scientific text. It may be, for example, research papers, thesis or reports, reviews of scientific means ordering information, summarizing the results of the pilot study, graphical interpretation of research results and more.

**Computer Integrated Control Systems.** Creation and operation of computer-integrated control systems that ensure the solution of problems of coordinating the functioning of subsystems, the use of intelligent subsystems for decision support based on databases and knowledge and their management systems. Computer-integrated technologies are closely related to automatic control systems and process automation in various industries and production.

**Cloudy Technology.** Basic information on the emergence, development and use of cloud technologies, typologies of cloud resource deployment (private, public, hybrid, public, etc.) is considered. Methods and features of designing cloud services, advantages and disadvantages of cloud computing models and solutions based on them are studied. You get the skills to develop applications for major platforms. The expediency of transferring existing applications to the cloud environment is determined, the efficiency of application and long-term prospects are assessed. Issues of security, deployment, backup in the context of cloud infrastructure are considered. An overview of current solutions of cloud computing market leaders (Amazon, Microsoft and Google, etc.).

**Internet of Things programming.** Development of software and hardware systems and computer intelligent systems of the Internet of Things. The software of the Internet of Things, features of programming of the Internet of things, features of development of the software for a network exchange, protocols of wireless network exchange of management of devices of the "Internet of Things" are considered; operating systems for Internet of Things; low-level and high-level software development languages (C ++, C #, Java and others); cloud services, information security of the Internet of Things; software documentation requirements.

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**EDUCATIONAL AND RESEARCH INSTITUTE  
OF FORESTRY AND LANDSCAPE-PARK MANAGEMENT**

**Director** - Doctor of Agricultural Sciences, Professor Petro Lakyda

Tel: (+38044) 527-85-28

E-mail: lakyda@nubip.edu.ua

Location: Educational Building №1, room 119

The ERI organizes and coordinates educational process of master training in education program within specialties:

**Specialty 187 “Woodworking and furniture technologies”**

***Educational program “Woodworking and furniture technologies”***

Guarantor of the educational and professional program – Olena Pinchevska, Doctor of Technical Sciences (Engineering), professor

Departments in charge of graduate training:

**Wood products technologies and design:**

Tel.: (044) 527-81-67

E-mail: opinchewska@gmail.com

Head of department – Olena Pinchevska, Doctor of Sciences (Engineering), Professor

**Specialty 205 «Forestry»**

***Educational program «Forestry»***

Guarantor of the educational and professional program – PhD of Agricultural Sciences, assistant professor Oleksandr Bala

Departments in charge of graduate training:

**Forest restoration and meliorations**

Tel.: (044) 527-87-47

E-mail: a\_pinchuk@nubip.edu.ua

Head of the Department – PhD of Agricultural Sciences, assistant professor Andrii Pinchuk

**Silviculture**

Tel.: (044) 527-82-82

E-mail: lisivnutstvo@gmail.com, npuzrina@nubip.edu.ua

Head of the Department – PhD of Agricultural Sciences, assistant professor Nataliia Puzrina

**Forest Mensuration and Forest Management**

Tel.: (044) 527-85-23

E-mail: bilous@nubip.edu.ua

Head of the Department – doctor of science, professor Andrii Bilous

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**Specialty 206 “Park and Gardening Management”**

***Educational program “Park and Gardening Management”***

Guarantor of the program - PhD of Agricultural Sciences , assistant professor Olha Sukhanova

Departments in charge of graduate training:

**Landscape Arhitecture and Phytodesign:**

Tel.: (044) 527-85-47,

E-mail: okolesnichenko67@gmail.com

Head of the department - biological sciences, professor Olena Kolesnichenko

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**Training of masters of sciences  
in branch of knowledge "Production and Technologies"  
in specialty 187 "WOODWORKING AND FURNITURE TECHNOLOGIES"  
educational program "WOODWORKING AND FURNITURE TECHNOLOGIES"**

Form of Training:	Licensed number of persons:
– Full-time EPP	40
– Part-time	40
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of woodworking and furniture technologies

**The concept of training**

Master's training in the specialty involves the assimilation of knowledge and skills of developing the designs and technologies of wood materials and products manufacturing, of determination of their characteristics and quality level, mastering of the techniques for analyzing of the existing processes, planning and carrying out the researches aimed for the processes optimization and woodworking industry improving.

After the successful completion of master's education, the graduate should be able to solve the following problems:

- to analyze the technical process of a certain product manufacturing and to make recommendations for its improvement;
- to analyze the structure of wood products and to make recommendations for its improvement;
- to develop the routing of the certain wood product;
- to develop the structure of the certain wood product and to draw it;
- to calculate the cost of the certain wood product manufacturing and the payback period on its implementation;
- to adjust the machines for certain wood products manufacturing;
- to calculate the parameters of power and aspiration for a particular technological process;
- to give the scientific evidence concerning the changes of a timber drying equipment structure.

**Educational and professional program of master's training**

***Optional Block "Woodworking technologies"***

The basis the program's optional block is a systematic approach to the study of woodworking technology and forming of students' ability to use equipment, wood and energy rationally. Disciplines cover the theoretical and practical aspects of the technologies of wood products manufacturing, trends of the woodworking technology, modern requirements for wood products, features of the modern woodworking machinery, new materials used in the wood products manufacturing, new accessories, methods of the details dimensions calculations of the contemporary structural wood products.

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### **Areas of employment of graduates**

The masters of "Woodworking and Furniture Technologies" of the optional block "Woodworking technologies" use their skills in related educational institutions of I-II and III-IV accreditation levels, government and commercial enterprises of the production and sale of construction materials, government and commercial woodworking enterprises (engineer-technologist, Controller of the wood production, specialist, leading specialist, head of the production unit, head of the company). Besides, this level of the professional training allows to work as a junior researcher, researcher, senior researcher, lecturer, assistant in research and educational institutions, to participate in the international research projects.

### ***Optional Block "Furniture technologies"***

The basis the program's optional block is a systematic approach to the study of furniture technologies and forming of students' ability to use equipment, wood and wood-based materials. The aim of this block is to form students' skills of rational use of equipment, wood and wood-composite materials in furniture production. Disciplines cover the theoretical and practical aspects of the technologies of wood products manufacturing, trends of the woodworking technology, modern requirements for wood products, features of the modern woodworking machinery, new materials used in the wood products manufacturing, new accessories, the design technologies development directions, requirements for furniture products, basic artistic design, the main features of furniture styles, modern trends of the style solutions for the furniture products and the means of their implementation

### **Areas of employment of graduates**

Masters of the selection block "Furniture technologies" apply their qualification in related higher education institutions of I-II and III-IV levels of accreditation, state and commercial enterprises for production and sale of furniture products, state and commercial furniture enterprises (designer of furniture products, designer of furniture products, designer, engineer-technologist, controller of furniture production, specialist, leading specialist, head of production unit, head of enterprise). In addition, the level of professional training allows you to work as a junior researcher, researcher, senior scientist, leading researcher, teacher, assistant in research and educational organizations, participate in international research projects.

### **Practical training**

The bases of practical training are educational, scientific and production laboratories of the university's departments and separate unit of NULES of Ukraine «Boyarka Forest Research Station». Leading forest enterprises of the State Forestry Agency of Ukraine and private woodworking and furniture enterprises.

### **Proposed Topics of master's qualification thesis:**

1. Foundation of technology facades finishing of solid wood for the furniture for the woodworking industry.
  2. Prospects for the introduction of deck board production technology to the woodworking industry.
  3. Investigation of accuracy and workmanship of the molded products on the woodworking industry.
  4. Foundation of the measures on improving the technological process of furniture manufacturing on the woodworking industry.
  5. Foundation of furniture manufacturing technology at the enterprise.
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6. Foundation of the proposals concerning the improvement of floorboards manufacturing technology at the woodworking industry.
7. Improving of the technological process of polymer production manufacturing at the woodworking industry.
8. Foundation of the modern methods of coatings application while manufacturing the furniture products.
9. Foundation of the infrared heaters applicability for veneer drying.
10. Research of the volume indicators of round timber cutting for the timber production at the woodworking industry.

**Curriculum of Master training  
in educational program "Woodworking and furniture technologies"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Innovative Woodworking Technologies	6	Exam
CC 2	Fundamentals of Pedagogical Skills and Ethics of the Teacher of Higher Education	4	Exam
CC 3	Forest Policy	4	Exam
CC 4	Current problems of woodworking	4	Exam
CC 5	Methodology and Organization of Research in Woodworking Technologies	4	Exam
CC 6	Occupational Safety and Health	4	Exam
<b>Optional components of EPP</b>			
<i><b>Free choice according to the preferences of students from the list of disciplines</b></i>			
OCP 1	Optional subject 1	4	Test
OCP 2	Optional subject 2	4	Test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 7	Planning and Design of Wood Products	9	Exam
CC 8	The Theory and Practice of Mechanical Wood Processing	6	Exam
CC 9	Modeling and Optimization of Technological Processes	4	Exam
CC 10	Technological preparation of woodworking and furniture industrie	4	Exam
CC 11	Energy use of wood	4	Exam
CC 12	Training practice	2	Test
CC 13	Production practice	6	Test
CC 14	Preparation and defense of master's qualification thesis	5	
<b>Total</b>		<b>66</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to specialty</b></i>			
<i><b>Optional Block 1. "Woodworking technologies"</b></i>			
OC 1.1	Planning at the Woodworking Industry	4	Exam
OC 1.2	Mechanics of wood	4	Exam
OC 1.3	Newest Woodworking Equipment	4	Exam
OC 1.4	Technology Of Special Woodworking Industries	4	Exam
<i><b>Optional Block 2. "Furniture technologies"</b></i>			
OC 2.1	Foreign Trade in the Furniture Enterprises	4	Exam
OC 2.2	Mechanical and Technological Properties of Wooden Structures	4	Exam
OC 2.3	Modern Equipment for the Furniture Production	4	Exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 2.4	Bonding theory and technology	4	Exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Innovative Woodworking Technologies.** Formation of students' knowledge, skills and abilities necessary for the proper design and organization of technological processes in woodworking industries, rational methods of their operation, as well as for active engineering activities aimed at improving the quality of wood products. Study of the state of world raw material bases; solving problems of manufacturing technologies: timber products of different species, value-added products, board materials, construction materials, paper, energy and residential complexes based on wood; definition of domestic and world innovative developments in the field of wood processing.

**Fundamentals of Pedagogical Skills and Ethics of the Teacher of Higher Education.** Studies ethics of high school teacher and the basics of pedagogical skills.

**Forest Policy.** Basic concepts of the discipline. Subject, purpose and concept of forest policy. Levels of forest policy. Basic principles of forest policy. Components of forest policy. Aims and objectives of forest policy. Conditions, goals and objectives in Ukraine. Legislation in the field of social, financial and environmental law as instruments of forest policy. Forestry legislation. Forest Code of Ukraine. Analysis of the distribution of government functions in the forestry sector in Ukraine and ways of its reform. The main functions of the state. Strategic priorities of forest policy in Ukraine. Environmental, economic and social aspects of sustainable development. Criteria and indicators of sustainable forest management. The concept of sustainable development in Ukraine. The principles of sustainable forest management. Basic concepts and definitions of certification and forest certification. Features of forest policies of European countries.

**Current problems of woodworking.** Study of current problems of technology of wood-composite materials and wood products. The current state of the forest and woodworking industries. Study and research of the latest materials, equipment and technologies for the manufacture of wood products, issues of rational use of raw materials. Ability to communicate with a professionals and use scientific and technical documentation in the subject area using a foreign language.

**Methodology and Organization of Research in Woodworking Technologies.** Students learn the theory dimensionality, physical modeling, statistical methods for object models building. Regressive model of the research object. Elements of the experiment planning theory. Plans of the multifactor experiments. Characteristics of the main stages of the research. Principals of the patents, features of the patents at the woodworking.

**Occupational Safety and Health.** The purpose of studying the discipline of providing knowledge, skills, abilities (competencies) to carry out effective professional activities by ensuring optimal management of labor protection at enterprises (objects of economic, economic and scientific-educational activities), formation of students' responsibility for personal and collective security and awareness of the need for full compliance by all measures to ensure occupational safety in the workplace. The main task

is the formation of theoretical and practical knowledge skills of future specialists in woodworking and furniture technologies in accordance with the goal.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Planning and Design of Wood Products.** The purpose of discipline: professional training in the field of production of wood products and parts, as well as active engineering and design activities aimed at the manufacture of wood products, as well as the rational use of wood raw materials. The main tasks of the practical part - the development of the basics of artistic design, taking into account ergonomic requirements for wood products, mastering the basic concepts of the systematic approach to designing; the principles of structural and functional organization of new systems, techniques and means of natural, as well as dynamic and kinetic shaping in furniture design.

**The Theory and Practice of Mechanical Wood Processing.** Scientific principles of the wood cutting technology, theory of logs cutting for the timber, posture calculation and planning of logs cutting, wood cutting optimization criteria, standardization of raw at the timber cutting, methods of experiments conducting at the timber cutting and its planning, analysis of the equipment and technologies of logs cutting, simulation of logs cutting; practical recommendations for the technological processes of the timber production.

**Modeling and Optimization of Technological Processes.** Estimation of the basic parameters of statistical aggregate. Analysis of the dependencies of the functional response on the parameters of influence. The method of least squares for constructing single-factor models. Fundamentals of planning full-featured experiments. Construction of mathematical models with the help of experimental plans of the second and third order. Optimization of objects by the method of coordinate search and steep climbing. Simplex-planning method for object optimization study.

**Technological preparation of woodworking and furniture industries.** The aim of the discipline: to provide knowledge about the technological preparation for the manufacture of wood products, basic technological and regulatory documents, ancillary equipment, integrated and economical use of materials, world achievements in woodworking and modern equipment. The tasks of the discipline according to the requirements of the credit-module system and the recommendations of the European Credit Transfer System (ECTS), is that the master must be theoretically and practically prepared for organizational and managerial, design and research activities in the field of implementation and creation of new modern technologies. processes in woodworking and furniture industries.

**Energy use of wood.** The purpose of the discipline: training of high level specialists in the field of technology of energy use of wood, development of creative thinking with skills of rational use of wood biomass as fuel and related equipment, testing and implementation of technologies, technical means of energy use and environmental protection. The main tasks are to study the main types of wood raw materials as fuels, features of their production, study of modern technological processes of wood biomass production, ways to improve quality and reduce production costs based on creative thinking with skills of rational planning, design and implementation of technologies and technical means. production.

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**Optional components of EPP**

***Free choice according to specialty***

***Optional Block 1. "Woodworking technologies"***

**Planning at the Woodworking Industry.** Subject, method and objectives of the discipline. The system of plans operated at the woodworking industry. Business planning at the workplace. Regulatory information management of the planning process. Production program and its formation. Work and wages planning over / on plants. Planning of production costs according to the market conditions. Financial planning for the woodworking enterprises

**Mechanics of Wood.** The course "Wood Mechanics" is aimed at studying students physical and mechanical properties of wood materials during their processing, used as structural materials under conditions of static and dynamic loads taking into account changes in temperature and processes associated with the duration of operation with simultaneous reliability, durability and cost effectiveness.

**Newest Woodworking Equipment.** Modern technical solutions in the designs of equipment for wood and wood materials processing, constructions of modern technological equipment.

**Technology Of Special Woodworking Industries.** Technology of special woodworking industries: consumer products, cooperage products, flooring, match, chip packaging, carbonization. Flow charts, machinery, equipment, raw materials and production quality requirements.

***Optional Block 2. "Furniture technologies"***

**Foreign Trade in the Furniture Enterprises.** Purpose of the course - acquisition of theoretical foundations in the area of foreign trade the forestry sector, and to develop practical skills and the ability to apply the acquired knowledge in export-import operations furniture industry.

**Mechanical and Technological Properties of Wooden Structures.** The issue of mechanical and technological properties of wood materials for all types of strains. The problems of elasticity of isotropic, anisotropic and orthotropic bodies, rheology, physical properties of wood of various breeds. These practical calculations compounds constructions of wood with real operating conditions.

**Modern Equipment for the Furniture Production.** The purpose of the discipline is to provide students with a complex of knowledge and skills that are necessary for the correct economical choice of the latest equipment for the furniture production.

**Bonding Theory and Technology.** The purpose of the discipline is to provide students with a deep theoretical knowledge of the laws of the development of technologies of integrated and rational use of primary and secondary raw materials in the production of glued materials, improving the quality of products, improving productivity, reducing the cost of production.

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**Training of masters of sciences  
in branch of knowledge "Agricultural Science and Food"  
in specialty 205 "FORESTRY"  
educational program "FORESTRY"**

Form of Training:	Licensed number of persons:
– Full-time EPP	100
– Part-time	75
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Forestry

**The concept of training**

The full operation of forestry in a market economy requires highly specialized professionals capable of solving specific problems scale production and research directions. The basis of the formation of the contents Master programs put:

- compliance with existing and future needs of the forestry;
- flexibility in the system of training for their adaptation to the rapidly changing demands of national and international labor markets;
- the integration of education, research and innovation on the pattern of the leading research universities in the world;
- logical relationship of master's programs of training programs education level "Bachelor".

The content of education masters determined by the relevant industry standard of higher education in Ukraine, namely: educational qualification characteristics, educational and vocational training program.

**Educational and professional program of master's training**

***Optional Block «Applied Silviculture and Game Management»***

The program provides training with a deeper understanding of the nature of the forest and forest multivariate relationships with the environment, growth and use of forests, ensuring the successful adaptation of alumni in the workplace.

**Areas of employment of graduates**

After graduation, graduates can be employed in the following organization: state forestry and game management enterprises of the State Forest Resources Agency of Ukraine (chief forest district ranger, chief forester, reforestation forester etc.), Ukrainian Center for training, retraining and advanced training of forestry "Ukrtsentrkadrylis", related universities I-IV accreditation, zoological parks, natural reserve fund institutions, Ukrainian State Project and Searching Institute of Forestry "Ukrdiprolis", Ministry of Ecology and Natural Resources of Ukraine (scientist).

***Optional Block «Integrated Fire and Pest Management»***

This block focused on the formation of students' complex knowledge and practical skills to solve important problems of developing bioecological foundations of a

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comprehensive system of protection and rehabilitation of forest biocenoses, studying pathogens in forest stands and developing a system of measures to combat them.

#### **Areas of employment of graduates**

After graduation, graduates can be employed in the following organization: state forestry and game management enterprises of the State Forest Resources Agency of Ukraine (chief forest district ranger, chief forester, reforestation forester etc.), Ukrainian Center for training, retraining and advanced training of forestry "Ukrtsentrkadrylis", related universities I-IV accreditation, zoological parks, natural reserve fund institutions, Ukrainian State Project and Searching Institute of Forestry "Ukrdiprolis", Ministry of Ecology and Natural Resources of Ukraine (scientist).

#### ***Optional Block "Forests Restoration and Breeding"***

Program provides advanced mastery of theoretical knowledge and latest technologies for the organization and operation of permanent forest-seed base, forest seed production, microclonal reproduction of woody plants, forest and decorative nurseries, restoration of forests on the basis of ecologically oriented forestry, forest plantations, rehabilitation of technogenically disturbed lands and improvement of forest productivity by forestry methods.

#### **Areas of employment of graduates**

Upon termination of city council graduating students can be employed on such enterprises: State forestry and hunting's enterprises of the State agency of forest resources of Ukraine (forester, main forester, forestry engineer, chief of the plantation nursery forest), Ukrainian Research Institute of forestry and agroforestry named after G.M. Vysotskyi, Center for training, retraining and advanced training of forestry "Ukrtsentrkadrylis", related higher education institutions, Ministry of Ecology and Natural Resources of Ukraine (scientist).

#### ***Optional Block «Reproduction of forests and forest melioration»***

Program foresees the deep capture of theoretical knowledge's and newest technologies from organization and exploitation of permanent forest seed base, forest seed, microklonal propagation of woody plants, forest and decorative nursery, recreation of the forests, on principles of the ecologically oriented forestry, forest plantations, rehabilitations technogenic broken earths and increase of the productivity of the forests of silvicultural methods. Training is carried out in order to equip of modern scientific and practical knowledge creation and use of protective forest plantations, as an integral part of the erosion zonal anti-erosion systems and the basis of architectonic of forest agricultural landscapes.

#### **Areas of employment of graduates**

Upon termination of city council graduating students can be employed on such enterprises: State forestry and hunting's enterprises of the State agency of forest resources of Ukraine (forester, main forester, forestry engineer, chief of the plantation nursery forest), Ukrainian Research Institute of forestry and agroforestry named after G.M. Vysotskyi, Center for training, retraining and advanced training of forestry "Ukrtsentrkadrylis", related higher education institutions, Ministry of Ecology and Natural Resources of Ukraine (scientist).

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***Optional Block «Forest melioration»***

Передбачає поглиблене опанування теоретичних знань та новітніх технологій створення та використання захисних лісових насаджень, як невід'ємної складової частини зональних протиерозійних систем.

**Areas of employment of graduates**

Upon termination of city council graduating students can be employed on such enterprises: State forestry and hunting's enterprises of the State agency of forest resources of Ukraine (forester, main forester, forestry engineer, chief of the plantation nursery forest), Ukrainian NDI of forestry and agroforestry the name of G.M. Visockogo, Ukrainian center of preparation (scientist).

***Optional Block «Management of forest resources and forest business»***

Master's program is focused on training in economics for forestry sector, able to develop and implement strategic vision in forest management and forest use at different levels in a market economy.

**Areas of employment of graduates**

After graduation, graduates can be employed in such enterprises: state forestry, forestry and hunting and hunting enterprises of the State Agency of Forest Resources of Ukraine (forester, chief forester, forest use engineer, forestry engineer) Ukrainian center for training, retraining and advanced training of forestry "Ukrcentrkadrylis" related higher education institutions of I-IV accreditation levels, zoological parks, the Nature Reserve institution, Ukrainian State Planning Institute of Forestry "Ukrdiprolis", Ministry of Ecology and Natural Resources of Ukraine (scientist).

***Optional Block «Forest Management in Eastern Europe»***

After graduation, graduates can be employed in such enterprises: state forestry, forestry and hunting and hunting enterprises of the State Agency of Forest Resources of Ukraine (forester, chief forester, forest use engineer, forestry engineer) Ukrainian center for training, retraining and advanced training of forestry "Ukrcentrkadrylis" related higher education institutions of I-IV accreditation levels, zoological parks, the Nature Reserve institution, Ukrainian State Planning Institute of Forestry "Ukrdiprolis", Ministry of Ecology and Natural Resources of Ukraine (scientist).

**Areas of employment of graduates**

After graduation, graduates can be employed in such enterprises: state forestry, forestry and hunting and hunting enterprises of the State Agency of Forest Resources of Ukraine (forester, chief forester, forest use engineer, forestry engineer) Ukrainian center for training, retraining and advanced training of forestry "Ukrcentrkadrylis" related higher education institutions of I-IV accreditation levels, zoological parks, the Nature Reserve institution, Ukrainian State Planning Institute of Forestry "Ukrdiprolis", Ministry of Ecology and Natural Resources of Ukraine (scientist).

**Proposed Topics of master's qualification thesis:**

1. Role of erosion and reclamation properties ravine and gully vegetation in forest enterprises.
  2. Increasing of productivity and improving of the quality of the forest plantations by care cuttings in forestry enterprises.
  3. Improvement of forest fire protection in forestry enterprises.
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4. An improvement of high-quality composition and increase of the productivity of the forest planting is in forest enterprises.
5. Natural renewal of main forestry breeds is in the prevailing types of site conditions in Forestry enterprises.
6. Ways of perfection of growing of forest cultures are in forestry enterprises
7. Sanitary condition Arboretum: cell pathogens and insect pests.
8. Current status and characteristics game management in Ukraine.
9. Modelling growing stock volume and dynamics of forest stands parameters.
10. Assessment of forest ecosystem services.
11. Forest resources management under market economy and global climate change.

**Curriculum of Master training  
in educational program "Forestry"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Forestry Management	5	exam
CC 2	Forest policy	4	exam
CC 3	Methodology and organization of scientific research on the forestry ecosystems	4	exam
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Regulation of forest productivity	6	exam
CC 5	Planning Forestry	9	exam
CC 6	Sustainable forestry	4	exam
CC 7	GIS technology	6	exam
CC 8	Production practice	7	
CC 9	Preparation and defense of master's qualification thesis	5	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty</i></b>			
<b><i>Optional Block 1 «Applied Silviculture and Game Management»</i></b>			
OC 1.1	Timber Industry	6	exam
OC 1.2	Forest Roads and Forest Transport	5	exam
OC 1.3	Non-wood Resources and Side Uses of the Forest	5	exam
OC 1.4	The Biological Basis of Clear Cuttings	6	exam
OC 1.5	Management of population of wild animals	5	exam
OC 1.6	Forest Ecology and typology	4	exam
OC 1.7	Training practice	1	
<b><i>Optional Block 2 «Integrated Fire and Pest Management»</i></b>			
OC 2.1	Forest Pathology with the basics of Phytoimmunity	5	exam
OC 2.2	Monitoring Harmful Organisms of Forest Ecosystems	6	exam
OC 2.3	Integrated Forest Protection	5	exam
OC 2.4	Early warning and wildfire hazards in forests	6	exam
OC 2.5	Integrated landscape fire management	5	exam
OC 2.6	Diagnosis of pests and pathogens	4	exam
OC 2.7	Training practice	1	
<b><i>Optional Block 3 «Forest restoration and meliorations»</i></b>			

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
OC 3.1	Modern technologies of forestry nursery	4	exam
OC 3.2	Ecoadaptation forest restoration	6	exam
OC 3.3	Industrial methods of forest plantations	5	exam
OC 3.4	Forest-cultural methods to increase the productivity of forests	5	exam
OC 3.5	Systems of erosion soils control	5	exam
OC 3.6	Modern technologies of forestry seed production	6	exam
OC 3.7	Training practice	1	
<i>Optional Block 4 «Reforestation and afforestation»</i>			
OC 4.1	Modern technologies of seed production and nursery	6	exam
OC 4.2	Microclonal reproduction of woody plants	5	exam
OC 4.3	Modern approaches to forest reproduction	6	exam
OC 4.4	Forest-cultural methods to increase the productivity of forests	5	exam
OC 4.5	Forest plants of green belts	5	exam
OC 4.6	Industrial methods of forest plantations	4	exam
OC 4.7	Training practice	1	
<i>Optional Block 5 «Forest melioration»</i>			
OC 5.1	Erosion science and systems of soils erosion control	6	exam
OC 5.2	Protective afforestation	5	exam
OC 5.3	Protective plantations management	5	exam
OC 5.4	Optimization of forest-agricultural landscapes	4	exam
OC 5.5	Forest recultivation of lands	6	exam
OC 5.6	Ecoadaptation restoration of forests	5	exam
OC 5.7	Training practice	1	
<i>Optional Block 6 «Management of forest resources and forest inventory»</i>			
OC 6.1	Forest Recourses Management	6	exam
OC 6.2	External Economic Activity in Forestry Sector	4	exam
OC 6.3	Forest Information Systems	5	exam
OC 6.4	Special Types of Forest Inventory	5	exam
OC 6.5	Forest Inventory and Monitoring	6	exam
OC 6.6	Forest Productivity Modeling	5	exam
OC 6.7	Training practice	1	
<i>Optional Block 7 «Forest Management in Eastern Europe»</i>			
OC 7.1	Vegetation Fires: Science & Management	6	exam
OC 7.2	Pest Management in Forests of Eastern Europe	6	exam
OC 7.3	Forest ecosystem services	4	exam
OC 7.4	Agroforestry systems, practices and technologies	5	exam
OC 7.5	Impact of natural disturbances on growth and yield	5	exam
OC 7.6	Forest Inventory and Mapping	5	exam
OC 7.7	Training practice	1	
<b>The total amount of compulsory components</b>		<b>50</b>	
<b>The total amount of optional components</b>		<b>40</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

**Annotations of disciplines in the curriculum**

**GENERAL TRAINING CYCLE  
Compulsory components of EPP**

**Forestry Management.** Includes the study of a systematic approach to the management of production, mastering organizational, functional and official regulation on forestry enterprises, evaluation of personal and professional qualities of workers, develop creative approach to the study and management decisions taking into account the specific characteristics and forestry production.



**Forest policy.** Basic concepts of the discipline. Subject, purpose and concept of forest policy. Levels of forest policy. Basic principles of forest policy. Components of forest policy. Aims and objectives of forest policy. Conditions, goals and objectives in Ukraine. Legislation in the field of social, financial and environmental law as instruments of forest policy. Forestry legislation. Forest Code of Ukraine. Analysis of the distribution of government functions in the forestry sector in Ukraine and ways of its reform. The main functions of the state. Strategic priorities of forest policy in Ukraine. Environmental, economic and social aspects of sustainable development. Criteria and indicators of sustainable forest management. The concept of sustainable development in Ukraine. The principles of sustainable forest management. Basic concepts and definitions of certification and forest certification. Features of forest policies of European countries.

**Methodology and organization of scientific research on the forestry ecosystems.** Disclosed, the concept of scientific knowledge, science, classification of sciences and basic concepts that define the content of the research. Outlined overview of the methodology and the classification of research, especially research in forest conditions and methods used for this purpose. The problems concerning planning and sequencing research students and young scientists working on the scientific literature.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE** **Compulsory components of EPP**

**Regulation of forest productivity.** Discipline study after study program issues of forestry, forest inventory, forest species, forest reclamation and hydraulic engineering, forest genetics and breeding, which can solve the problem of forest productivity and improving their quality comprehensively. Details the performance concept, its types, nature wood productivity and ways to improve forestry and silvicultural ways, including the selection and genetic basis.

**Planning Forestry.** Subject, method and objectives of the discipline. Basic principles and methods of planning in market conditions. The system plans that operate in the forestry industry. Methodology formation of tactical and strategic plans for forest production. Regulatory information management planning process. Analysis of the implementation plan of the enterprise for the last time. The product and its formation. Business planning for forest enterprises. Plan your work and wages in forest enterprises. Planning logistics for I / d plants. Planning costs of forest products in market conditions. Financial planning for forest enterprises. Features pricing and their bottom Forestry enterprise.

**Sustainable forestry.** The formation of a comprehensive forest management strategy in Ukraine should in accordance with the criteria that create the preconditions for achieving parity of environmental, economic and social aspects of sustainable development. In this context, it is a training course on the formation of future forestry professionals with a systematic vision of the implementation of the conceptual foundations of sustainable development in the practice of forestry. Concentrated of integration of environmental, economic and social aspects of sustainable development during forest creation, formation of sustainable plantations, accounting and use of forest resources, forest protection and conservation, including to ensure low-carbon forestry based on modern international experience.

**GIS technology.** The subject aims to study the basic information tools for forest management and processing information for decision-making. Working with databases, standard office applications, network tools, database "forest management".

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**Optional components of EPP*****Free choice according to specialty******Optional Block 1 «Applied Silviculture and Game Management»***

**Timber Industry.** The course program provides an overview of the current state and prospects of integrated use of forest resources; technological schemes and technical means for carrying out logging, transport and lower-warehouse works, forest cutting and forest chemistry; principles of workpiece optimization; rational planning schemes and methods of designing and optimizing technological processes of timber and sawmill units of the enterprise.

The training course allows you to acquire skills in manning the system of machines and designing technological processes of industrial harvesting of forest products.

**Forest Roads and Forest Transport.** The study of the discipline generates scientific knowledge regarding the principles of the organization of forest road transport networks, the selection and determination of optimal schemes and technical and economic indicators of their work. The ways of establishment of optimum cargo areas of forest roads and their influence on the structure and location of transport networks are considered.

Introduction to the design of the road as an engineering structure, its basic elements and projections. Materials and technologies of forest road construction are considered.

**Non-wood Resources and Side Uses of the Forest.** Integrated use of non-timber forest resources. Procedure for harvesting non-timber forest resources. Setting limits for harvesting non-timber forest resources. Area accounting and yield determination of mushrooms, berries and medicinal plants. Rational use and increase of productivity of wild berries, mushrooms and medicinal plants. Plantation breeding of fruit and berry plants and medicinal plants. Artificial breeding of mushrooms. Organization and technology of birch juice extraction.

**The Biological Basis of Clear Cuttings.** Biological rationale for clear cuttings. Formation of forest plantations. Changing environment in plantations and physiological processes in woody plants under the influence of clear cuttings. The influence of clear cuttings on the photosynthetic apparatus of woody plants. Calculation of the leaf index. Impact of clear cuttings on productivity and quality of stands. Clear cuttings as the main link of forest cultivation. Optimization of methods and modes of clear cuttings.

**Management of population of wild animals.** The study of the discipline aims to develop the theoretical base and practical skills in mastering the system of world hunting resources and their rational use, to study the world's faunistic complexes and to develop effective ways of using the resources and practical implementation of this knowledge and skills in farming and hunting. As a result, students will have modern requirements for the functioning of the hunting industry; to know the basic hunting complexes of landscape-geographical zones of the country; the biology, ecology and ethology of game animals; basics of aviary breeding of hunting animals; methods of accounting for resources of hunting fauna; the leading factors that determine the success of breeding and conservation of hunting animals; be able to identify species that are promising for use in hunting economies in particular regions and throughout Ukraine; methods of protection and rational use of hunting fauna, fight against poaching.

**Forest ecology and typology.** In studying forest ecology emerging necessary theoretical knowledge on forest ecology and skills for management and restoration of forest ecosystems. The basic concept autecology and synecology are studied, also studied the impact of environmental factors on forest ecosystems. It reveals the need for ecological approach to the study of the forests. Highlights the environmental principles of the approach to the study of the formation of forests, forest care outlined the concept of forest typology, its formation and use for the science and forestry practice

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*Optional Block 2 «Integrated Fire and Pest Management»*

**Forest Pathology with the basics of Phytoimmunity.** General information about the pathology of forest tree plants. Protective properties of wood plants. Basic signs of forest pathology. Ecology and dynamics of forest diseases. Mechanisms of attack on a plant of pathogens and theoretical and applied principles of forest protection against pathogens. System interaction of the host plant, pathogen and the environment. Theories, types and categories of plant immunity. Passive and active immunity. Vertical and horizontal resistance of plants to pathogens. Methods of assessing the resistance of woody plants to pathogens. Ways of induction of demotion processes in forest biocenosis (forestry, forestry, breeding, etc.).

**Monitoring Harmful Organisms of Forest Ecosystems.** Forest-pathological monitoring. Theories of mass reproduction of harmful insects and pathogens. Regulatory mechanisms of dynamics of the number. Stability of plantations. Modeling the dynamics of the development of harmful organisms in forest ecosystems. Types of mathematical models in forest protection. Technological stages of mathematical modeling. Prognosis of pathogens and pests. Short-term, long-term and long-term prognosis of pathogens of illnesses and harmful insects.

**Integrated Forest Protection.** Tasks of forest management bodies of forest protection. Forest-pathological supervision. General principles of accounting and forecasting of the number of phytopathogens and forest wreckers. Pest Number Counting and Projection. Forest-entopathological examination. Forest-pathological monitoring. Forest protection measures planning and assessment of their effectiveness. Quarantine.

**Early warning and wildfire hazards in forests.** The course is including overview of modern systems of early warning with accent on most wide used indexes: Fire Weather Index, Nesterov Index, KBDI and others. Within course student will get a sound theoretical background and practical skills in the assessment and analysis of fire hazards in forests, gain knowledge about the theory of the process of burning and behavior of forest fires; theory of fire environment and the factors that determine it; classification of combustible materials, natural fire hazard and its dynamics in different landscapes; fire regimes in different regions of Ukraine and the world and the factors that determine them; accounting of fire hazard in fire management policy. Will be able to calculate current and predictive value of indexes based on use of meteorological data; apply obtained knowledge for modelling of parameters of grassland and forest fires.

**Integrated landscape fire management.** Within the course the holistic view on wildfires in landscapes will be presented including description and analysis of key factors that determine igniting of fires and their behavior: land-use, ignition sources, topography, aspects, rivers, streams and lakes, anthropogenic factors, fuel, forestry and agriculture, infrastructure, weather patterns etc. Role of involving of all stakeholders in landscape fire management including city and village authorities, emergency services, forest service, protected areas management, small and medium land owners, NGO's, local communities etc. will be presented. Systematic approach on implementation of integrated landscape fire management, including, early warning systems, prevention measures, ground and aviation detection, fast response, strategy and tactics of fire suppression, rehabilitation, interagency cooperation, training of interagency personal. Most used systems of incident management will be presented including Incident Command System and EUROFIRE and main features will be compared within Ukrainian wether, landscapes types, land-use and fire services.

**Diagnosis of pests and pathogens.** Diagnosis of tree and shrub diseases. Configuration and usage of different instruments and tools. Methods for various diagnostic analyses.

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*Optional Block 3 "Forest Restoration and Meliorations"*

**Modern technologies of forestry nursery.** Forest seed production of Ukraine: current state, problems and prospects. The permanent forest seed base of the forest industry, its current state and compliance with the challenges and requirements of today. The relevance of the transition to forest varietal seed and its regulatory framework. Legislative and regulatory support for domestic seed production (Laws of Ukraine "On seeds and planting material", "On plant quarantine", "On protection of rights to varieties of Ukraine" and other acts), its modern meaning and interpretation. State-of-the-art equipment and innovative technologies for forestry seed production. Modern machines for harvesting and processing of forest and raw material. New ways of storage, preparation of seeds for sowing and improvement of its sowing qualities. The newest technologies of reproduction and obtaining of the healthy seedling material of woody plants of a certain purpose. Ways of modern cultivation of seedlings in open ground with open root system. Improvement of cultivation of planting material of woody plants with closed root system. Modern methods of intensification of cultivation of seedlings in closed soil and boxes. Ways to increase the profitability of production of ornamental seedlings with open and closed root system. Methods of healthy and rehabilitation of permanent forest nurseries.

**Ecoadaptation forest restoration.** Current expanded forest reproduction as a basis for modern forestry management in Ukraine. Modern approaches to forest reproduction and their importance in the context of sustainable balanced forestry. Ecoadaptation approach to forest reproduction, its relevance and current importance. Basic principles of ecoadaptation reproduction of forests. Zoning of the territory on the potential success of natural reforestation. Conceptual (general and specific) provisions, organizational and methodological principles and conditions for introduction of ecoadaptation reproduction of forests. Ecological and forestry classification of areas of forest reproduction fund as the basis of scientifically sound use of methods and methods of ecoadaptation reproduction of forests. Requirements for methods and methods of ecoadaptation approach from artificial forest reproduction. Agrotechnology of ecoadaptation reproduction of forests, their features and conditions of use. Features of ecoadaptation reproduction of forests in areas of different categories of plots of forest reproduction fund.

**Industrial methods of forest plantations.** Plantation forestry its relevance and modern importance. Basic conceptual principles of the transformational approach to plantation forestry. Types of plantation plantations and their features. Potential productivity of plantation crops and selection of woody plants. Principles of organization, creation, cultivation and operation of forest plantations. Regional peculiarities of technologies of creation of forest plantations of fast-growing coniferous and deciduous tree species. Features of creation of plantations of woody plants of different purpose.

**Forest-cultural methods to increase the productivity of forests.** The current importance of biological stability and complex productivity of forest biogeocenoses and the relevance of their increase in anthropocene conditions. Factors that determine the stability and imbalance of natural forest ecosystems. Types of forest productivity. Features of regulation of endogenous and exogenous factors of influence on biological stability and productivity of forest biocenoses. Forest-cultural methods of increasing biological stability and productivity of forest plantations (introduction of new approaches to forest reproduction, improvement of types of forest crops, application of fertilizers, reconstruction of low-value plantations, creation of understory forest crops, introduction of introductions, etc.). Features and measures to improve biological sustainability and productivity of forests for various purposes.

**Systems of erosion soils control.** Substantiation of the use for zonal systems. System of measures for water erosion control: organizational-economic, agro-technical,

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agroforestry and hydrotechnical. A complex of measures to combat wind erosion (deflation). Erosion in mountainous areas and measures to combat it. Features of zonal systems. Economics and organization of works for soil erosion control.

**Modern technologies of forestry seed production.** Theoretical principles and organization measures of transferring forest seed production to the genetic and breeding base. The concept of variety and varietal categories of forest woody plants seeds. The organization of the permanent forest seed base on genetic and breeding principles. Laws and regulations of varietal forest seed production. The main provisions of regulatory legal acts that regulate relations in the field of varietal seed. The structure, the main provisions, the scope and the application of the Laws of Ukraine "On Seeds and Planting Material", "On Plant Quarantine", "On Protection of Rights of Varieties of Ukraine". The methods of varietal plant breeding of woody plants. Registration, sustentation and exploitation of the variety of woody plants in the register of varieties of Ukraine.

#### *Optional Block 4 «Reforestation and Afforestation»*

**Modern technologies of seed production and nursery.** Forest seed production of Ukraine: current state, problems and prospects. The permanent forest seed base of the forest industry, its current state and compliance with the challenges and requirements of today. The relevance of the transition to forest varietal seed and its regulatory framework. Legislative and regulatory support for domestic seed production (Laws of Ukraine "On seeds and planting material", "On plant quarantine", "On protection of rights to varieties of Ukraine" and other acts), its modern meaning and interpretation. State-of-the-art equipment and innovative technologies for forestry seed production. Modern machines for harvesting and processing of forest and raw material. New ways of storage, preparation of seeds for sowing and improvement of its sowing qualities. The newest technologies of reproduction and obtaining of the healthy seedling material of woody plants of a certain purpose. Ways of modern cultivation of seedlings in open ground with open root system. Improvement of cultivation of planting material of woody plants with closed root system. Modern methods of intensification of cultivation of seedlings in closed soil and boxes. Ways to increase the profitability of production of ornamental seedlings with open and closed root system. Methods of healthy and rehabilitation of permanent forest nurseries.

**Microclonal reproduction of woody plants.** Methods and ways reproduction of woody plants and current value and relevance of microclonal reproduction. Advantages of using the microclonal propagation method over traditional methods. Modern directions of culture of isolated cells, tissues and organs of plants. Biosafety basics. Features of plant regeneration in vitro. Types and main stages of microclonal reproduction. Obtaining virus-free planting material. Main directions of biotechnological research in forestry. Features of reproduction of tree species. Influence of genetic, physiological, hormonal and physical factors on plant micropropagation. Adaptation of regenerant plants to in vivo conditions. Use of planting material of regenerating plants in forestry production and ornamental nurseries.

**Modern approaches to forest reproduction.** Modern expanded forest reproduction as a basis for modern forestry management in Ukraine. Modern approaches to forest reproduction and their importance in the context of sustainable balanced forestry. Basic principles of ecoadaptation forest reproduction and transformation (plantation) cultivation. Conceptual provisions and organizational and methodological foundations of introducing ecoadaptation reproduction of forests. Agrotechnology of adaptation reproduction of forests, their features and conditions of use. Features of ecoadaptation reproduction of forests in areas of different categories of areas of forest reproduction fund. Types of plantation plantations and their features. Potential productivity of plantation crops and selection of woody plants. Principles of organization of forest raw plantations.

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Improving growing conditions. Regional technologies of creation of raw material plantations of coniferous and deciduous tree species. Features of creation of plantations of woody plants of different purpose.

**Forestry methods of rehabilitation of technogenically disturbed lands.**

Technogenesis and its importance at the present stage of society development. Types and agrotechnics of forestry on anthropogenically polluted lands. Types and agrotechnics of forest plantations on man-made lands.

**Forest-cultural methods to increase the productivity of forests.** The current importance of biological stability and complex productivity of forest biogeocenoses and the relevance of their increase in anthropocene conditions. Factors that determine the stability and imbalance of natural forest ecosystems. Types of forest productivity. Features of regulation of endogenous and exogenous factors of influence on biological stability and productivity of forest biocenoses. Forest-cultural methods of increasing biological stability and productivity of forest plantations (introduction of new approaches to forest reproduction, improvement of types of forest crops, application of fertilizers, reconstruction of low-value plantations, creation of understory forest crops, introduction of introductions, etc.). Features and measures to improve biological sustainability and productivity of forests for various purposes.

**Industrial methods of forest plantations.** Plantation forestry its relevance and modern importance. Basic conceptual principles of the transformational approach to plantation forestry. Types of plantation plantations and their features. Potential productivity of plantation crops and selection of woody plants. Principles of organization, creation, cultivation and operation of forest plantations. Regional peculiarities of technologies of creation of forest plantations of fast-growing coniferous and deciduous tree species. Features of creation of plantations of woody plants of different purpose.

*Optional Block 5 «Forest melioration»*

**Erosion science and systems of soils erosion control.** Concepts, classification and categories of soil erosion. Water erosion: ancient and current, factors of its development; physical properties and erosion of rain, energy structure of surface runoff. Wind erosion; dust storms. Erosion forecasting, deflation modeling. Erosion zoning. Research methods and properties of eroded soils. Substantiation of zone anti-erosion systems. System of measures for water erosion control: organizational-economic, agro-technical, agroforestry and hydrotechnical. A set of measures to combat wind erosion. Erosion in mountainous areas and measures to combat it. Features of zonal systems. Economics and organization of soil protection works against erosion.

**Protective afforestation.** Forest and field are the only ecological system. Structure of forestry landscape. Agroforestry parameters of forest-agricultural landscape. Forest component of agrolandscape. Forest protection cover. Agroforestry monitoring. Features of formation of protective forest plantations on agricultural lands.

**Protective plantations management.** The basics of inventory of protective plantations. Legal principles of management of protective plantations. Agroforestry inventory of protective forest plantations on agricultural lands. Modern types of forest management.

**Optimization of forest-agricultural landscapes.** Principles of formation of optimal forest-agricultural landscapes. Forest cover modeling of agrolandscapes. Optimization of the land fund structure. Agroforestry monitoring. GIS technologies in landscape studies.

**Forest recultivation of lands.** Objects of recultivation and causes of soil cover disturbance. Areas of reclamation. Specificity of plant conditions of disturbed territories. Methods of improving soil mixtures of soil recultivation layer. Features of technology of

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creation of plantations for various objects of recultivation. Environmental aspects of biological land reclamation.

**Ecoadaptational restoration of forests.** Current approaches to restoration of forests and their importance in the context of sustainable forest management. Basic principles of ecoadaptational restoration of forests. Zoning of territory for the potential success of natural regeneration. Conceptual provisions and organizational and methodological foundations of introduction ecoadaptational restoration of forests. Agrotechnologies of adaptive restoration of forests, their characteristics and conditions of use. Features of ecoadaptational restoration of forests on the different categories of forest restoration fund.

*Optional Block 6 « Management of forest resources and forest inventory »*

**Forest resources management.** The course introduces advanced theoretical and practical background of forest resources management under market economy and global climate change. This course covers topics addressing fundamentals of forest management (including system approach as a basis for decision-making, risk management in forestry, forest resources management in a crisis situation), forest resources management in the context of sustainable development and requirements for forest products legality, management priorities towards diversifying the activities of forest enterprises.

**External economic activity in forestry sector.** This course offers a theoretical introduction to the external economic activities of forest enterprises. Within the course students will develop practical skills and ability to apply the knowledge in export-import operations in forestry sector. The academic discipline is focused on legislative principles of external economic activity and entrepreneurship in forestry and the procedure for concluding forestry contracts with foreign companies.

**Forest Information Systems.** The aim of the academic discipline is to enhance knowledge and practical skills of students related to information systems. The expertise in information systems is gained through addressing specific management issues in forestry using database management systems, GIS and information search systems.

**Special Types of Forest Inventory.** The course aims to introduce mensurational aspects applied in the description of forest landscapes, inventory of shelterbelts, protected forests, recreational areas and natural reserves. The study discipline also covers methods of wildlife populations assessment used in game management.

**Forest Inventory and Monitoring.** The study course provides theoretical background of the sample-based forest inventory. The course is designed to provide students with training in forest inventory using fixed- and variable-area plot sampling. It covers fundamentals of sampling theory and their application in national forest inventories, recent advances of forest assessment, optimization of inventory design using different plot size and configuration. The course provides also knowledge of long-term forest condition monitoring.

**Forest Productivity Modeling.** Classification of models. Modeling as the main process of study of forest objects. Criteria for optimal stands. Development of regression models using modern mathematical methods. Peculiarities of development of models of dynamics and prognosis. Modeling growth functions with modern computing techniques. Planning of active experiment. Development of mathematical models using full and partial factor plans. General knowledge on numerical methods for solving optimization tasks.

*Optional Block 7 «Forest Management in Eastern Europe»*

**Vegetation Fires: Science & Management.** The course address basics of vegetation fire science and management that recently become challenging problem for natural resource managers. Within the fire course students get skills in wildland fire

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management, fuels management, and restoration based on advancing knowledge of fire science, ecology, fire-related policy and social issues, and the latest tools and technology. The course covers fire conditions, tactics, and strategies to mitigate fire and fire behaviors, emphasizing wildland and urban interface fires. Includes an interdisciplinary review and study of wildfires as ecological process. Special attention will be paid to the role of vegetation fires in the context of global environmental change. Addresses current issues in fire ecology in Ukraine, Eastern Europe and globally, including readings and discussions of recent scientific literature.

**Pest Management in Forests of Eastern Europe.** The academic discipline provides students with theoretical knowledge and practical skills in relation phytopathological monitoring; diagnosing the causes of damage or damage to forest stands; forecasting the spread, development and harmfulness of phytophages and forest pathogens; developing effective protection measures; technological methods of their implementation, as well as economic and environmental assessment of results. The concept of integrated management of populations of harmful organisms is a steady decrease in their numbers through various measures and methods based on taking into account biocenotic relationships and the dynamics of populations of harmful and beneficial organisms.

**Forest ecosystem services.** Being a biological object, forests have a much higher value than merchantable timber, especially within the densely populated territories. The course deals with the questions of description and quantification of forest ecosystem services, which helps to reflect the cumulative effect of forests on the environment. A quantitative assessment of the services of forest ecosystems mentioned above also creates preconditions for their further economic evaluation.

**Agroforestry systems, practices and technologies.** Agroforestry as an integral part of land use systems. Concept and principles of agroforestry. Types of agroforestry. Experience of developed countries in the development and dissemination of agroforestry technologies. Influence of agroforestry systems on increasing the ecological and economic potential of agro-landscapes. Problems and methodologies of research of agroforestry systems. Regional differences in land use based on agroforestry approaches and their environmental benefits. Current technologies and practices of agroforestry.

**Impact of natural disturbances on growth and yield.** Ukraine as a country features many areas disturbed by natural and anthropogenic factors. The course provides knowledge on quantitative assessment of the impact of disturbances on forest growth and yield. This forms an underlying basis for further implications in landscape planning and design as well as in forest management on the disturbed territories.

**Forest Inventory and Mapping.** The course is focused on the theoretical foundations of the sample-based forest inventory which in combination with remote sensing data provides a spatially explicit assessment of forest attributes. The course is designed to provide students with training in forest inventory using fixed- and variable-area plots and introduce the approaches for optimization of sampling design as well as statistical computations in national forest inventory. The course also introduces the necessary knowledge of mapping forest attributes using machine learning and imputation techniques.

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**Training of masters of sciences**  
**branch of knowledge "Agricultural science and food"**  
**in specialty 206 "PARK AND GARDENING MANAGEMENT"**  
**educational program "PARK AND GARDENING MANAGEMENT"**

Form of Training:	Licensed number of persons:
– Full-time EPP	75
– Part-time	75
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master of Park and Gardening Management

**The concept of training**

The concept and goal of training specialists in Park Gardening Management is the necessity of training specialists with system knowledge in use of Park Gardening Management resources in our state and transition to European standards of living that are focused on the natural ability of regeneration of forests: ensuring ecological and esthetical management based on forest management and comprehensive use of resources, taking into account historical and landscape aspects, revisions of principles of distribution of plantations according to ecological and economic value depending on benefits of their functions, decreasing recreational activity, replacement of old planting, especially in the forests of green belts situated around settlements; preservation of biodiversity of planting of general and limited use; inventory and optimization of protected areas and objects; including measures of regional ecological, economic and social conditions; monitoring of planting, creation and growing plants resistant to extreme environmental conditions of forest biogeocenosis in Steppe considering the necessity of transfer of management on the landscape- ecological principles; improvement of scientific and staff providing Park Gardening management; improvement of the system of planting inventory and monitoring and objects of landscape architecture based on GIS technology; improvement of the system of informing industry and introduction of information technologies.

**Educational and professional program of master's training**

***Optional Block "Landscape architecture"***

Oriented to forming in future specialists complex approach to analysis, ground of acceptance and realization of decisions in exploitation, reconstruction and restoration of park and garden objects, planning of landscape objects of the different special purpose by means of modern computer technologies se in accordance with modern requirements of Park Gardening Management in Ukraine.

**Areas of employment of graduates**

The graduates of Master's program "Landscape architecture" will be able to work as: junior research worker, planning and organization of public services engineer or specialist, landscape design specialist, park-gardening worker.

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### ***Optional Block “Landscape building”***

Foresees mastering by student's theoretical knowledge and practical skills in economic and building work on landscape objects, mastering the latest engineering technologies in creating of landscaping objects, planting and caring of decorative plants, studying machines and mechanisms, which are necessary for creating, organization and keeping of landscaping objects.

#### **Areas of employment of graduates**

Graduates of Master's program “Landscape building” would be able to work as: junior research worker, planning and organization of public services (improvement) engineer, landscaper, green planting or laying out of parks worker, gardener.

### ***Optional Block “Decorative Nursery”***

Foresees mastering by student's theoretical knowledge and modern technologies of decorative planting stock production: generative, vegetative and microclonal woody plants reproduction, container culture of trees and shrubs, features and growing, shaping and using different purpose seedlings, etc.

#### **Areas of employment of graduates**

Graduates of Master's program “Decorative Nursery” would be able to work as: junior research worker, nursery garden chief, planning and organization of public services engineer, landscaper, green planting worker, gardener.

### ***Optional Block “Ecodesign of the urban environment”***

It provides theoretical knowledge and practical skills of new technologies of formation and maintenance of green spaces of different functions, assortment of highly decorative and resistant to adverse environment factors trees, shrubs and flower plants; techniques, methods and technology of breeding and cultivation of ornamental plant material in the open and protected ground.

#### **Areas of employment of graduates**

Graduates of master's program “Ecodesign of the urban environment” would be able to work as: junior research worker, green planting master, green planting or laying out of parks worker, gardener, nursery garden chief, hothouse farm master.

### **Practical training**

The bases of practical training, which is carried out during the course of training and production practices in the second semester of study, are educational, educational, scientific and production laboratories of the departments of the Institute and structural units of the University: Separated subdivision of NULES of Ukraine “Boyarka Forestry Research Station”, educational and research nursery of the Department of Forest Restoration and Forest Melioration, Grishko National Botanical Garden, Fomin Botanical Garden, Kyive landscaping Enterprises, regional and district enterprises of housing, communal services and green economy, private structures and nurseries.

#### **Proposed Topics of master's qualification thesis:**

1. Territory reconstruction project of the landscape art memorial park.
  2. Ornamental painting of stones in small gardens' design.
  3. Project of recreation-demonstrational area organization in decorative nursery garden.
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4. Project of landscaping and improvement of the territory of different functional purpose.
5. Experience of school territories in Ukraine landscaping.
6. European experience of using species of *Buxus L.* genus in landscaping.
7. Dendrological grade of existing assortment of Gymnosperms and prospects of replenishment the decorative forms collection of botanical gardens.
8. Designing of engineering communications in the territory of landscape facilities.
9. Technological peculiarities of forcing flowering plants varieties.
10. Baroque, rococo and classicism in modern phytodesign aspect.
11. Woody plants reproduction peculiarities.

**Curriculum of Master training  
in specialty "Park Gardening Management"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Computer design technologies	5	Exam
CC 2	Landscape planning	4	Exam
CC 3	Management in gardening	4	Exam
CC 4	Methodology and organization of scientific research on the basics of intellectual property	4	Exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	Test
OCP 2	Optional subject 2	4	Test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 5	Shape variety of ornamental plants with basics of dendrodesign	6	Exam
CC 6	Reconstruction and restoration of landscape-gardening objects	5	Exam
CC 7	Forest-park economy	4	Exam
CC 8	Ornamental plants protection	4	Exam
CC 9	Exploitation of garden-park objects	4	Exam
CC 10	Seedling, cultivar flowering plants	5	Exam
CC 11	Academic Practice	12	Test
CC 12	Production Practice	2	Test
CC 13	Preparation and defense of master's qualification thesis	5	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Landscape architecture"</i>			
OC 1.1.	Landscape design	6	Exam
OC 1.2.	Park science	6	Exam
OC 1.3.	Conceptual design	6	Exam
<i>Optional Block 2 "Landscape building"</i>			
OC 2.1.	Vertical planning of landscape objects	6	Exam
OC 2.2	Gardens on artificial grounds	6	Exam
OC 2.3	Phytodesign of interiors	6	Exam
<i>Optional Block 3 "Ornamental Nursery"</i>			
OC 3.1	Modern technologies in ornamental nursery studies	6	Exam
OC 3.2	Potted woody plants growing	6	Exam
OC 3.3	Biotechnology methods in decorative nursery	6	Exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<i>Optional Block 4 "Ecodesign of the urban environment"</i>			
OC 4.1	Eco-technology of ornamental horticulture	6	Exam
OC 4.2	Organization and service of country-recreation	6	Exam
OC 4.3	Protected park science and phytocenology	6	Exam
<b>The total amount of compulsory components</b>		<b>64</b>	
<b>The total amount of optional components</b>		<b>26</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

## Annotations of disciplines in the curriculum

### GENERAL TRAINING CYCLE Compulsory components of EPP

**Computer design technologies.** Knowledge of modern computer technologies and programs, polygraphic reproduction of projected objects, as well as visualization skills in accordance with specific subjects in the design of garden and park objects.

**Landscape planning.** Within the discipline, social and urban-planning aspects of the formation of landscape objects are being worked out. The theoretical bases and practical methods of landscape design of objects of various functional purposes are considered.

**Management in gardening.** Formation of theoretical knowledge and practical skills of future specialists in landscape management in relation to the management and marketing system necessary to ensure the adoption and implementation of effective solutions related to the activities of these enterprises in the market conditions.

**Methodology and organization of scientific research on the basics of intellectual property.** The concept of scientific knowledge, science, classification and basic science concepts of the content of research are expand. General information about the methodology and classification of research, especially research in the forest and methods used for this purpose are set out. The questions on planning and consistency of research students and young researchers working on the scientific literature are set out.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Shape variety of ornamental plants with basics of dendrodesign.** Form diversity of woody plants is a part of dendrology that studies woody plant cultivars, classification of decorative qualities, production methods, biological and ecological features. While studying the basics of arboretum design, students must master the basic principles of designing green systems, features of landscape-spatial and landscape-planning composition, features of selection of the range of woody plants when creating the basic compositional elements of plantings.

**Reconstruction and restoration of landscape-gardening objects.** Theoretical positions and practical issues of pre-project study the territory of garden-park objects of different functional purpose and especially the application of methods of reconstruction, restoration, conservation and reproduction in the course of renovation work.

**Forest-park economy.** The theoretical positions and practical skills of creating highly aesthetic, ecologically stable forest park plantations of the functional designation and organization of forest park management in settlements.

**Ornamental plants protection.** Species composition of the main types of pests (insects, ticks, nematodes, rodents) and pathogens (fungi, bacteria, viruses) of ornamental plants. Symptoms and features of damage / damage to plants by pathogens. Methods of

monitoring and accounting for plant pests and pathogens. Development of preventive and extermination methods and means of protection of ornamental plants, prediction of possible pathological changes in biocenoses.

**Exploitation of garden-park objects.** Theoretical and practical training of specialists on the organization of works at the landscape garden objects, agricultural care directions, the formation of decorative, resistant to environmental conditions of the plantings and their maintenance in proper condition in cities and other settlements.

**Seedling, cultivar flowering plants.** The discipline envisages the study of commonly used techniques of varieties of flower and ornamental plants. Masters study the classification of species and varieties of the most common herbal plants, as well as the peculiarities of their usage at the objects of garden and park construction. Flower design projects using varieties of different species, hybrids of herbs. Masters also learn to develop the techniques of growing flower plants and evaluate the cost-effectiveness and innovation-technological risks associated with the introduction of cutting-edge technologies.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1 "Landscape architecture"*

**Landscape planning.** Landscape planning as a modern direction of landscape architecture, the object of which is a small garden. The use of style elements of the landscape and the principles of landscape architecture when creating a small garden.

**Park science.** The study of natural landscapes as the source material for park-building, general trends in the development of park phytocenosis, the issue of the ecology of the park environment, the physiognomic types and groups of woody plants, the peculiarities of the creation some types of garden-park landscapes, the formation of exhibitions of botanical gardens and arboretums.

**Conceptual design.** The discipline introduces the role of artistic and aesthetic concepts, the problems of innovative designing on the basis of social programs, the process of forming ideas and their subsequent implementation in the subject-space environment. He teaches creative search methods, develops critical thinking and decision-making skills in the field of the latest problems and trends in landscape architecture and design.

##### *Optional Block 2 "Landscape building"*

**Vertical planning of landscape objects.** Study of basic concepts, principles, methods, requirements of normative documents and the sequence of work execution when drafting vertical planning of urban territory, residential development, areas of green spaces.

**Gardens on artificial grounds.** The course studies modern methods of landscaping horizontal and vertical surfaces, technological, biological and aesthetic issues of creating gardens on an artificial basis in exteriors and their design features in interior design, selection of plants for different types of garden.

**Phytodesign of interiors.** As a result of studying the discipline future masters will get theoretical knowledge and practical skills interiors of various destination. In the first module, they will master the skills of phytocomposite formation, selection of plants, taking into account their biology and microclimate of the interior, as well as the style of the interior. In the second module, future masters will master the theoretical material on the arrangement of winter gardens and will acquire practical skills for the creation of floras.

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*Optional Block 3 "Ornamental nursery"*

**Modern technologies in ornamental nursery studies.** World experience of planting stock growing. Planning of ornamental planting stock growing measures. Features of ornamental nurseries organization and agrotechnics of planting stock growing.

**Potted woody plants growing.** Scientific bases of decorative planting stock in a container culture organization of production. Technological features of growing and use of planting stock with the closed root system for green planting for urban landscapes.

**Biotechnology methods in ornamental nurseries.** Modern state and prospects of development of method of microclonal reproduction of arboreal plants. Calusogeny, morphogeny and features of microclonal reproduction of decorative woody plants.

*Optional Block 4 "Ecodesign of the urban environment"*

**Eco-technology of ornamental horticulture.** The study of the discipline provides future specialists with the ability to dynamically combine knowledge, practical skills, communication skills and autonomous activities, theoretical and practical knowledge about the range of decorative plants, how they are bred, the technology of creating or exploiting ornamental gardens and growing environmentally friendly products.

**Organization and service of country-recreation.** Masters will learn the basics for planning and assessment of recreational infrastructure objects, as well as modern scientific conceptions, the definition of recreational infrastructure, methods of studying the organization of recreational services. The various potentials of natural and cultural landscapes as a tourist destination are investigated. Using theoretical models, masters will be able to predict the impact of recreational offerings on the ecological, economic and social conditions of the region. They will be able to evaluate the infrastructure of the recreational areas in terms of their sustainability and develop proposals for sustainable recreation.

**Protected park science and phytocenology.** As a result of the study of the discipline, the masters will learn the stages of historical development of reserve park science; the current state of the network of Ukrainian protected parks; international and national parks classification; the procedure for the creation of manmade protected parks, their management system, structural and functional organization, methods of preservation, enrichment, reproduction and usage. The second module focuses on the fundamentals of park phytocenology, the teaching of which will provide future specialists with a holistic view of the structure, dynamics, and functioning of plant communities, including forests, urban forests and park. Phytocenological knowledge should be basic for the formation of landscape and other types of phytocoenocompositions.

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## **LAW FACULTY**

**Dean** – Doctor of Law, Professor Yara Olena Sergiivna

Tel.: (044) 259-97-25

E-mail: lawyer\_dean@twin.nubip.edu.ua

Location: Building № 6, Room 231

Faculty organizes and coordinates educational process of master training in educational program within specialties:

### **Specialty 081 "Law"**

#### ***Educational program "Law"***

Guarantor of the educational and professional program – Doctor of Law, Associate Professor Deineha Maryna Andriyivna

Graduating department:

#### **Agrarian, land and environmental law named after V.Z. Yanchuk**

Tel.: (044) 259-97-25

E-mail: agrolaw\_chair@twin.nubip.edu.ua

Head of Department – Doctor of Law, Professor Yermolenko Volodymyr Mykhaylovych

#### **International Law and Comparative Law**

Tel.: (044) 259-97-25

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Head of Department – Doctor of Law, Professor Ladychenko Viktor Valerijovych

#### **Administrative and Finance Law**

Tel.: (044) 259-97-25

E-mail: adminlaw@twin.nauu.kiev.ua

Head of Department – Doctor of Law, Professor Kurylo Volodymyr Ivanovych

#### **Civil and Economic Law**

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E-mail: civillaw\_chair@twin.nubip.edu.ua

Head of the department – Doctor of Law, Associate professor, Piddubnyi Oleksiy Yuriyovych

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**Training of masters of sciences  
in branch of knowledge "Law"  
in specialty 081 "LAW"  
educational program "LAW"**

Form of Training:	Licensed number of persons:
– Full-time	75
– Part-time	75
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian
Qualification	Master of Law

**Training concept**

Program-targeted training of specialists in the field of law whose work is to establish the rule of law in society and the development of legal consciousness and legal culture of citizens. Training of highly qualified and competitive specialists in the field of law as a social phenomenon, its individual components (branches, institutions) in the selected block of elective disciplines with environmental and natural resource orientation, able to solve complex problems and problems in the learning process during scientific researches, as well as in the field of lawmaking and law enforcement. Education of a professional lawyer capable of solving legal support issues from various fields of social activity.

**Education and professional training program**

Education and professional training program (EPTP) corresponds to the mission of NULES of Ukraine in terms of creating, systematizing, preserving and disseminating modern scientific knowledge to improve people's lives, as it aims to study modern legal issues in the field of environmental safety, environmental protection, rational use and reproduction of natural resources. EPTP provides training for applicants of the second (master) level, who have general and special competencies in the field of law, with in-depth study of environmental and natural resources disciplines. Many of the disciplines are of personal authorship and are innovative. EPTP provides practical training of the specialty in public and local authorities, enterprises, institutions and organizations. EPTP is developed on the basis of the student-centered approach which is realized through individualization of education.

**Areas of employment of graduates**

EPTP provides training of highly qualified and competitive specialists in the field of law, including environmental lawyers; it is also aimed at environmental education and the formation of future lawyers' environmental culture. The level of training and qualification of graduates gives them the opportunity to work as legal advisers to economic entities in state executive bodies, local governments, relevant departments and offices that exercise authority of public policy implementing, including state environmental policy. EPTP also provides proper future scientific and pedagogical workers' training, namely assistant professor, senior lecturer, etc. EPTP provides an opportunity to continue education in the third-level (educational and scientific) program of higher education, the acquisition of additional qualifications in the adult education system.

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**Curriculum of Master training  
in educational program "Law"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Business Foreign Language	4	Exam
CC 2	Philosophy of law	5	Test/ Exam
<b>Total</b>		<b>9</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	Test
OCP 2	Optional subject 2	4	Test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Legal bases of sustainable development of rural areas	5	Test/ Exam
CC 4	Environmental policy and EU law	5	Test/ Exam
CC 5	Contract law	5	Test/ Exam
CC 6	Legal regulation of information relations	4	Test/ Exam
CC 7	Practical training	30	protection
<b>Total</b>		<b>49</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty</i></b>			
OC 1	Agrarian law of foreign countries	4	Exam
OC 2	Administrative responsibility in the field of natural resource management of Ukraine	4	Exam
OC 3	Administrative and legal regulation of environmental protection	4	Exam
OC 4	Current problems of agrarian law	4	Exam
OC 5	Current problems of administrative responsibility in Ukraine	4	Exam
OC 6	Current problems of management in the land relations field	4	Exam
OC 7	State registration of land plots and rights to them	4	Exam
OC 8	European Environmental Law	4	Exam
OC 9	European Energy Law	4	Exam
OC 10	European Climate Law	4	Exam
OC 11	European General Food Law Regulation	4	Exam
OC 12	Protection of environmental rights	4	Exam
OC 13	Intellectual Property Protection Rights to Plant Varieties	4	Exam
OC 14	Land law process	4	Exam
OC 15	Competition law	4	Exam
OC 16	Advocate's professional activity	4	Exam
OC 17	Corporate lawyer	4	Exam
OC 18	Mediation Law Practice	4	Exam
OC 19	Migration law	4	Exam
OC 20	International environmental law	4	Exam
OC 21	International economic law	4	Exam
OC 22	International Energy Security Law	4	Exam
OC 23	International Nuclear Security Law	4	Exam
OC 24	Patent law	4	Exam
OC 25	Environmental safety law	4	Exam
OC 26	Law and religion	4	Exam
OC 27	The law of International Treaties	4	Exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 28	Law of international organizations	4	Exam
OC 29	Law and the state of sustainable development	4	Exam
OC 30	Legal regulation of agricultural production	4	Exam
OC 31	Land market regulation	4	Exam
OC 32	Legal regulation of artificial intelligence	4	Exam
OC 33	Legal bases of ecological management	4	Exam
OC 34	The Basic Principles of Lawyers	4	Exam
OC 35	Commercial Litigation Concerns	4	Exam
OC 36	Problems of preventing and combating corruption	4	Exam
OC 37	Property rights problems	4	Exam
OC 38	Challenges in law enforcement reform	4	Exam
OC 39	Procedural order of ecological examination arrangement	4	Exam
OC 40	ECHR decisions in national proceedings	4	Exam
OC 41	Judicial lawmaking	4	Exam
OC 42	Current problems of the judiciary system in Ukraine	4	Exam
OC 43	Judicial interpretation	4	Exam
OC 44	Consumer rights protection	4	Exam
OC 45	Values and the Law	4	Exam
<b>Total</b>		<b>24</b>	
<b>The total amount of compulsory components</b>			<b>58</b>
<b>The total amount of optional components</b>			<b>32</b>
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Business Foreign Language.** The overall goal of the professional Foreign Language teaching Program is to form students' professional language competencies, which will contribute to their effective functioning in the cultural diversity of the educational and professional environment.

**Philosophy of law.** The educational unit is aimed at the formation of philosophical and legal thinking of masters students, skills and competencies necessary for professional activities based on the understanding of law as a cultural value.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Legal bases of sustainable development of rural areas.** The educational unit is aimed at developing students' skills and competencies necessary for professional activities on the basis of an integrated approach to rural development. It allows one to form an idea of theoretical and practical legal support problems in economic, environmental and social components of sustainable rural development.

**Environmental policy and EU law.** The task of the educational unit is to clarify the peculiarities of the knowledge system formation regarding the current state of environmental policy, legal regulation of the European Union environmental relations.

**Contract law.** Contract law is traditionally defined as a system of legal norms contained in the Civil Code of Ukraine, other acts of legislation and norms-requirements placed in other sources of law, that establish rules and procedures for concluding a contract, content of a contract, procedure of fulfilling contractual obligations, legal consequences of improper performance (non-performance) of contractual obligations and ways to protect violated rights of the contract parties.

**Legal regulation of information relations.** The purpose of studying the educational unit "Legal regulation of information relations" is to provide students with comprehensive knowledge on the topic of the state information policy and the modern information society.

**Optional components of EPP**  
***Free choice according to specialty***

**Agrarian law of foreign countries.** The educational unit is aimed at the formation of critical scientific thinking of students, skills and competencies necessary for professional activity on the basis of understanding the main trends in foreign agricultural legislation. It allows one to form an idea of the agricultural legislation system of the European Union, leading European countries, the United States and the post-Soviet legal space.

**Administrative responsibility in the field of natural resource management of Ukraine.** The purpose of studying the educational unit is to clarify the nature and features of administrative responsibility in the field of natural resource management by analyzing the legal aspects of state policy in the use, reproduction and protection of water resources (state water policy) as a part of public legal policy.

**Administrative and legal regulation of environmental protection.** The educational unit will provide an opportunity to form an environmental legal awareness; students will look into the dynamics and directions for improvement of legislative regulation of environmental protection; they will get acquainted with measures for preventing environmentally harmful activities and measures used to improve the environment, prevent and eliminate the consequences of accidents, catastrophes, natural disasters; the students will analyze the pattern of getting compensation in a judicial proceeding for damage caused to the health of individuals in result of environmental pollution and other harmful effects.

**Current problems of agrarian law.** The educational unit is aimed at developing the skills and competencies necessary for professional activities on the basis of understanding the latest trends in agricultural legislation of Ukraine. It allows one to form an idea of scientific approaches to understanding the content of agricultural relations, their subject and features in the legal status of the subjects of these relations.

**Current problems of administrative responsibility in Ukraine.** The educational unit is based on such areas as current problems of the theory of administrative coercion, administrative liability and administrative tort law in Ukraine, as well as the practice of law enforcement of administrative responsibility measures in public administration of Ukraine by officials of administrative jurisdiction.

**Current problems of management in the land relations field.** The purpose of the educational unit is to form students' theoretical knowledge on the problems of management functions legal support in the field of land relations: land use planning, land management, the State Land Cadastre maintenance, land monitoring, control over compliance with land legislation and the legal status features of government agencies in the land relations field, as well as the formation of practical skills for independent resolving the problems related to the management functions implementation.

**State registration of land plots and rights to them.** In the process of studying this educational unit, students will be offered a survey of Land Cadastre legal nature, management relations in the State Land Cadastre field, features of legal regulation of its individual components, legal support of state land registration, and liability for violations of State Land Cadastre legislation.

**European Environmental Law.** Within the framework of the educational unit, one will in-depth study the peculiarities of the legal regulation of certain areas of the European Union's environmental policy: the policy in the field of waste management, water protection

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policy, in particular. The best practices for the implementation of EU environmental policy in the individual state member are considered.

**European Energy Law.** In terms of the educational unit one will study the process of formation, current status and trends in the regulation of the European Union's energy relations. One will study the legal regulation of the energy market, the regulatory and legal support for the renewable energy development. Particular attention is paid to Ukraine and EU cooperation in the field of energy.

**European Climate Law.** The educational unit aims to provide students with basic knowledge about climate policy and EU law, the place of EU climate law in the general system of European law, the EU emissions trading system. One will study the legal regulation of certain areas of EU climate policy. Special attention is given to the EU Strategy on Adaptation to Climate Change, priority measures on adaptation to climate change in the European Union and to climate diplomacy.

**European General Food Law Regulation.** To ensure the implementation of the Association Agreement between Ukraine and the European Union, it is necessary to carefully study and adopt the experience of EU member states, as well as to train a new generation of professionals capable of effectively implementing the EU food policy in Ukraine.

**Protection of environmental rights.** The purpose of the educational unit is to acquire and deepen knowledge about the system of environmental rights and responsibilities of citizens, guarantees of implementation and ways of protection the environmental citizens' rights; to promote the obtaining of theoretical knowledge by students and to assist the formation of their practical skills and abilities to independently solving practical problems that arise in the process of implementation and protection of environmental rights.

**Intellectual Property Protection Rights to Plant Varieties.** The basis of the educational unit is an in-depth analysis of the ways to protect intellectual property rights to plant varieties and to study the practice of such civil disputes application by courts of Ukraine.

**Land law process.** The purpose of the educational unit is to ensure that students acquire new and thorough knowledge of the procedural problems of land rights; to develop practical skills in resolving specific cases on procedural issues of implementation and protection of subjective land rights; to form worldviews and legal awareness on the basis of the rule of law on procedural support for the land rights implementation and jurisdictional protection.

**Competition law.** The educational unit is aimed at studying the economic competition law, protection of economic relations participants from the manifestations of unfair competition. It allows master's students to form a system of knowledge on legal competition regulation and monopoly restriction.

**Advocate's professional activity.** The educational unit is aimed at forming students' basic knowledge about protection of the rights, freedoms and legitimate interests of citizens and legal entities; representation of citizens and legal entities both in relations with the state and among themselves; representation individuals and legal entities in courts and other state and law enforcement agencies; providing legal assistance to individuals and legal entities, to state and public institutions (associations); raising the level of public awareness in the legal field.

**Corporate lawyer.** Teaching forms and methods of this educational unit are aimed at conducting a legal analysis of juridical structures used in the practice of a corporate lawyer; studying theoretical and practical issues arising during the operation of a legal service (law department), law firm or self-employed lawyer and provided relevant services.

**Mediation Law Practice.** The educational unit will acquaint students with the

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theoretical and practical alternative ways of resolving conflicts (disputes) - mediation. In the process of studying students will be able to master the professional skills of forecasting, anticipation, settlement, resolving and overcoming the consequences of conflicts in various areas of legal practice.

**Migration law.** The purpose of studying the educational unit is for future lawyers to master theoretical knowledge and to form practical skills and abilities to independently solve practical problems related to internal and external migration; to thoroughly and comprehensively study the origin and development of legal regulation of migration process in Ukraine.

**International environmental law.** The educational unit involves studying of global environmental problems, concepts, matter, objects, methods, subjects, system, principles, sources, institutional mechanism, formation and development of international environmental law, environmental human rights and international legal mechanism for their protection, responsibility in international environmental law and the implementation of international agreements on environmental protection, international legal protection of ambient air, climate and near-Earth space, marine and freshwater environment.

**International economic law.** The purpose of the educational unit is to form knowledge about international economic law, its features, major industries and institutions; to acquire theoretical and practical knowledge and skills on the role and application of sources of international economic law in Ukraine.

**International Energy Security Law.** Energy is a key economic sector for many countries in the world in economic, social and political terms. At the end of the twentieth century, cooperation in the energy sector intensified markedly, especially after the crises that caused serious shocks in the world economy. The desire to solve these problems has led to a significant intensification of international energy policy on a global and regional scale. Energy security is largely determined by the state of global energy markets, which are becoming increasingly global. Currently, there is a development of a competitive environment in these markets, which leads to further intensification of international companies and intensification of the struggle between them. At the same time, interstate cooperation in the energy sector is being strengthened in order to avoid sharp price fluctuations, prevent destructive competition, and ensure stability and predictability in the market. The economic well-being and political stability of the world community depend on the development of these processes. The issue of energy security came to the fore in discussions at multilateral global and regional forums.

**International Nuclear Security Law.** The use of nuclear energy for peaceful purposes opens up extremely wide opportunities for improving the well-being of humanity. However, the increase in the number of scientific and industrial nuclear reactors, the intensification of trade in nuclear materials and their transportation, the disposal of spent nuclear fuel pose a potential threat of radioactive contamination of humans and the environment. However, due to its physical and chemical properties, radioactive contamination poses a danger to states that may be located far from the borders of the country where the nuclear incident occurred. The example of the greatest man-made catastrophe of the XX century, which occurred at the Chernobyl nuclear power plant in 1986, is a clear confirmation of this. These circumstances call for the joint efforts of the entire international community to ensure the safe development of nuclear energy and prevent the negative consequences of using the atom for peaceful purposes.

**Patent law.** The purpose of the educational unit is to for students to acquire certain amount of knowledge on the legal protection of rights to inventions, utility models and industrial designs, as well as to apply this knowledge and skills in practice.

**Environmental safety law.** The educational unit is aimed at deepening students' theoretical and practical knowledge on various aspects of environmental safety as a

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complex environmental law sub-branch and academic discipline. It aims for students to form practical skills and abilities to apply relevant legislation in actual practice of human rights, law enforcement, scientific and other types of legal activities.

**Law and religion.** The educational unit studies the dialectical connections between law and religion, their relationship as forms of consciousness and social regulators. The unit reveals peculiarities of legal regulation on religious affairs, formation of the mechanism of modern religious and legal systems mutual influence, their value bases, influence on norm-making processes, on legal consciousness and population legal culture, initial principles of optimization of the state and church relations in Ukraine.

**The law of International Treaties.** The purpose of the educational unit is to form knowledge about the Law of International Treaties, its principles and features; to form knowledge and competencies on the use of international treaties law sources in resolving specific situations.

**Law of international organizations.** The special importance of the activities of international organizations, their role in discussing and resolving the most complex issues of international relations necessitated the emergence of a separate branch of international law - the law of international organizations. And the rules are mostly contractual rules, namely the law of organizations - one of the most codified branches of international law. Sources in the field of international treaty law are the Vienna Convention on the Representation of States in Their Relations with International Organizations of Universal Nature of 1975, the Vienna Convention on the Law of Treaties between States and International Organizations or between International Organizations of 1986, the Privileges and Immunities Agreements organizations, etc. However, despite the fact that international organizations are derivatives of international law, have an independent will, different from the simple set of wills of states participating in the organization, their will, unlike the will of states, is not sovereign. Thus, the law of international organizations forms a set of rules governing the legal status, activities of the organization, its interaction with other subjects of international law, participation in international relations.

**Law and the state of sustainable development.** The new worldview paradigm, on which the Sustainable Development Strategy is based, is a political and practical model of such development in all countries of the world that meets the needs of the current generation without compromising the ability of future generations to meet their own needs.

**Legal regulation of agricultural production.** The educational unit aims for students to form critical scientific thinking, skills and competencies necessary for professional activity on the basis of understanding the basic principles of economic activity of agricultural producers.

**Land market regulation.** The educational unit aims for students to acquire an appropriate level of knowledge about the legal nature of the land market, legal aspects of institutional and functional support of market turnover of agricultural land, legal regulation of civil law agreements on alienation of land, sale of land on a competitive basis, legal basis for agricultural lands market formation.

**Legal regulation of artificial intelligence.** The educational unit aims to provide students with basic knowledge about how artificial intelligence affects different areas of public life and different areas of legal relations.

**Legal bases of ecological management.** The educational unit aims to deepen students' theoretical and practical knowledge about the legal nature of environmental management as one of the environmental management types; promote the acquisition of theoretical knowledge by students and the formation of their practical skills and abilities to independent solving practical problems that arise in the process of environmental enterprise management.

**The Basic Principles of Lawyers.** In the process of studying the educational unit,

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students will be able to consider issues of legal work at the enterprise, institution and organization, as well as to analyze the main directions of contractual and claim work, or the one that ensures compliance with the law.

**Commercial Litigation Concerns.** The educational unit is built in a way to ensure a consistent and logical material presentation, revealing the current problems of commercial litigation. The content of the economic procedural legislation is revealed.

**Problems of preventing and combating corruption.** The purpose of the educational unit is for students to form and develop a set of professional knowledge on the theoretical foundations and practical aspects of modern legal relations regulation in the preventing and combating corruption field; to understand the system of anti-corruption bodies, their tasks, functions and division of powers.

**Property rights problems.** The educational unit is aimed at deepening knowledge about property rights, forms of ownership and judicial practice of resolving property disputes. It aims for future specialists to master the theoretical foundations and problematic issues regarding the legal nature and content of property rights, analysis of legal and judicial practice on the application of current legislation in the field of property rights protection.

**Challenges in law enforcement reform.** The purpose of the educational unit is for students to form knowledge and skills on the general theoretical characteristics of the competence of law enforcement agencies, determining the legal guarantees of their activities. It also aims to form knowledge and skills on the problems of the law enforcement agencies duplication of powers, to process the scientists' suggestions on determination of ways that would optimize the formation and functioning of the law enforcement system in Ukraine.

**Procedural order of ecological examination arrangement.** The basis of the educational unit lies in an in-depth analysis of the grounds for the environmental expertise arrangement and the procedure of its conducting; in the parties' status on the case (their rights and responsibilities).

**ECHR decisions in national proceedings.** In the process of studying the educational unit, students will be able to thoroughly analyze which provisions of the Convention on Human Rights and Fundamental Freedoms, as well as its Protocols, are used by courts in Ukraine.

**Judicial lawmaking.** The educational unit is devoted to the study of the main theoretical and practical problems of legal regulation of judicial lawmaking. As a result, students will acquire skills and abilities to use technical and legal means and technology-based procedures of regulatory and precedent judicial lawmaking technology, which are used in the process of creating court regulations and judicial regulatory cases, as well as giving them legal force.

**Current problems of the judiciary system in Ukraine.** Today the problem of judicial reform in Ukraine is quite relevant, as the most important prerequisites for the democratic state's development are qualitative, stable legislation and effective justice system, which can really provide reliable protection of human rights and freedoms, as well as public and state interests protection. It is important to study and theoretically comprehend the new stages of reforming the Ukraine's judiciary system, bringing it closer to international standards for effective improvement and practical application.

**Judicial interpretation.** The purpose of the educational unit "Judicial interpretation" is for students to form the necessary basis of knowledge and practical skills for clarification and explaining the content of the legal acts and documents provisions in order to clearly and effectively apply them in a specific simulated situation and in further practical activities.

**Consumer rights protection.** The educational unit is designed for the second

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(master) level students to form a holistic view of the legal, socio-economic prerequisites of consumerism; to study the main stages of its development, characteristic features, tasks, directions of activity, to find out the place and role of consumer relations in the market economy system; to determine the main activities of state structures along with public associations and the organization principles of economic entities control in the consumer protection field.

**Values and the Law.** This educational unit is devoted to the study of law values together with law itself as a value; to the conflict of values, defining values and development priorities in the XXI century, clarifying the basic values of the European Area, establishing their interaction with civil society and government.

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## **FACULTY OF LAND MANAGEMENT**

**Dean** – Ph.D., Professor, Ievsiukov Taras Oleksiyovych

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Faculty (ERI) organizes and coordinates educational process of master training in education program within specialties:

### **Specialty 193 "Geodesy and Land Management"**

#### ***Educational program «Geodesy and Land Management»***

Guarantor of the educational and professional program – Doctor of Economics, Professor Martyn Andriy Hennadiyovych

Departments in charge of graduate training:

#### **Geodesy and Cartography**

Tel.: (044) 258-05-25

E-mail: kovalchukip@ukr.net

Head of Department – Doctor of geographical, Professor Kovalchuk Ivan Platonovych

#### **Land Resources Administration Management**

Tel.: (044) 258-05-25

E-mail: Uzr\_k@ukr.net

Head of Department – Doctor of Economics, Professor Dorosh Ol'ha Stepanivna

#### **Land-use Planning**

Tel.: (044) 258-05-25

E-mail: martyn@nubip.edu.ua

Head of Department – Doctor of Economics, Professor Martyn Andriy Hennadiyovych

#### **Land cadastre** Tel.: (044) 258-05-25

E-mail: natazv@ukr.net

Head of Department – PhD in Economics, Associate Professor Medynska Nataliia Vasylivna

#### **Geoinformatics and Aerospace Research of the Earth**

Tel.: (044) 258-05-25

E-mail: kokhan\_s@nubip.edu.ua

Head of Department – Doctor of technical, Professor Kohan Svitlana Stanislavivna

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**Training of masters of sciences  
in branch of knowledge “Architecture and Construction”  
in specialty 193 “GEODESY AND LAND MANAGEMENT”  
educational program “GEODESY AND LAND MANAGEMENT”**

Form of Training:	Licensed number of persons:
– Full-time	90
– Part-time	85
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian, English
Qualification	Master of Science in Geodesy and Land Management

**The concept of training**

The concept of training for specialty 193 “Geodesy and Land Management” aimed in training highly qualified specialists in land management, land conservation, land administration, environmental monitoring of geosystems and the state land cadastre. Training involves the formation of skills and abilities that allow Master students to solve independently complex issues of land use, land development projects and planning for environmental protection, monitoring and public control over rational use and protection of land, using modern information technologies for information on land resources.

**Educational and professional program of master's training**

***Optional Block “Land Management and Cadastre”***

The master's program related to the study and preparation of land use at the national and regional levels, programs and use of land, land management schemes and feasibility studies of land use and protection of lands of the administrative-territorial units, land management projects on establishing and changing the boundaries of administrative units, organizations and delineation of areas of natural conservation, recreational areas and also areas of historical and cultural significance.

**Areas of employment of graduates**

Setting the boundaries of land plots, approval of boundaries with adjacent land users, making the cadastral plan.

***Optional Block “Land Conservation”***

When studied in this master's program, students acquire skills and knowledge in the field of rational use and protection of land, restoration of soil fertility, increase productivity of forest land, providing special treatment of land use environmental, health, recreational, historical and cultural significance. Particular attention is paid to the learning standards and standardization in the field of land.

**Areas of employment of graduates**

Inspection activities in the field of land use and land conservation, prediction of land use changes, restrictions in land use and carry their registration.

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***Optional Block “GIS in Land management”***

Development and filling modern cadastral information systems.

**Areas of employment of graduates**

Modern GIS and remote sensing data necessary for carrying out work on the land, in municipal information systems, GIS management areas.

***Optional Block “Evaluation of land and property”***

Master's program aimed at creating specialized skills and knowledge to conduct regulatory and expert monetary value of land, determine the market value of real estate of the economic value of land and quality of soil, the use of automation systems evaluation activities, the conduct of local and regional databases of market value of land and property, service of civil operations for the disposal of real property.

**Areas of employment of graduates**

Regulatory and expert evaluation of land of all categories and custom real estate.

***Optional Block “Geodetic-cartographic technology in land management”***

Provides training for field-geodetic mapping of land management, performance geodetic and cartographic works, land inventory, accounting and registration of land. Much attention is also paid to technology of mapping of land use, zoning maps, optimizing land use, land use cartographic modeling problems, including using GIS technology, the characteristics of the national geospatial data infrastructure and so on.

**Areas of employment of graduates**

Creation of maps of land use, zoning maps and zoning, optimizing land use, land inventory.

**Practical training**

Curriculum of Master training on specialty “Geodesy and Land Management” has two practical trainings: production and pre-diploma practice. The practice of students is conducted to enhance the practical skills of the students by acquiring practical experience to solve production problems and the collection of materials about a specific company, which are necessary to perform the master's thesis. The leading databases and practical training are: State Agency on Land Resources and its units, the Center of the State land cadastre and its regional offices, scientific research and design institutes on land use, research institutions dealing with land management, monitoring, development; land management, State Inspection for Control over the use and protection of land and its regional offices.

**Proposed Topics of Master's qualification Theses**

1. Formation of territorial restrictions in land use, land management schemes.
  2. Legal and technical support of state control over rational use and protection of land.
  3. Agrolandscape optimization of land agricultural enterprises and administrative units.
  4. The use of information technology, design and modern technology to create cadastral maps, evaluation of land and other real estate. Remote sensing for updating cadastral plans and maps.
  5. Improved methods of economic and monetary value of land. Methods of soil evaluation.
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6. Methods of land and real estate evaluation.
7. Analysis and evaluation of the transformation processes in land use.
8. Methods of forecasting, planning, rational use and protection of land resources.
9. Ecological and economic aspects of regulation of agricultural land.
10. Normative and expert monetary evaluation of various categories of land.
11. Topographic and geodetic support of efficient use of lands for various purposes.

**Curriculum of Master training  
in educational program “Geodesy and Land Management”  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Business Foreign Language	4	Exam
CC 2	Methodology and Organization of Scientific Research on the Basics of Intellectual Property	4	Test
CC 3	Examination of Design and Survey Documentation	4	Test
CC 4	Land policy	4	Test
CC 5	Monitoring of Land Relations	4	Exam
CC 6	Standardization in Topographic and Geodetic Activities and Land Management	4	Exam
CC 7	Regulation of the Land and Real Estate Market	4	Test
CC 8	Organization of Topographic and Geodetic Activities and Land Management Works	4	Exam
CC 9	Information Technology and Patenting of Scientific Research	4	Test
CC 10	Economics of Land Use and Land Management	4	Exam
<b>Total</b>		<b>40</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	Test
OCP 2	Optional subject 2	4	Test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 11	Land Management and Real Estate Development	4	Exam
CC 12	Monitoring of Land Use	4	Exam
CC 13	Design Engineering	4	Exam
CC 14	Development of Real Estate Cadastres	4	Exam
CC 15	GIS in Cadastral Systems	4	Exam
CC 16	Production Practice	4	Test
CC 17	Preparation and defense of master's qualification thesis	2	Work protection
<b>Total</b>		<b>26</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 «Land Management and Cadastre»</i>			
OC 1.1	Systems of Automated Design in Land Management	4	Exam
OC 1.2	Territorial planning and Spatial Development	4	Exam
OC 1.3	Management of Quality of Land Surveying Works	4	Exam
OC 1.4	Standardization in Land Management and Cadastre	4	Exam
<b>Total</b>		<b>16</b>	
<i>Optional Block 2 «Land Conservation»</i>			
OC 2.1	Formation of agrolandscapes	4	Exam

**MASTER CURRICULA AND TRAINING PROGRAMS**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 2.2	Evaluation and Forecast of Land Quality	4	Exam
OC 2.3	Land Use Control	4	Exam
OC 2.4	Formation of Restrictions and Burdens in Land Use	4	Exam
Total		16	
Optional Block 2.3. «GIS in land management»			
OC 3.1	Geoinformation Modeling	4	Exam
OC 3.2	Methods of Remote Sensing	4	Exam
OC 3.3	Geospatial analysis	4	Exam
OC 3.4	Integration of GIS, RS and GNSS in Geosystem Monitoring	4	Exam
Total		16	
Optional Block 4«Evaluation of Land and Property»			
OC 4.1	Information Support of Land Valuation	4	Exam
OC 4.2	Registration of Real Property Rights	4	Exam
OC 4.3	Cadastres of Natural Resources	4	Exam
OC 4.4	Valuation of Land and Real Estate	4	Exam
Total		16	
Optional Block 5 «Geodetic-Cartographic Technologies in Land Management»			
OC 5.1	Computer Technologies in Cartography	4	Exam
OC 5.2	Geospatial Data Infrastructure	4	Exam
OC 5.3	Topographic, Geodetic and Cartographic Supply of Land Management	4	Exam
OC 5.4	Natural Resource Mapping	4	Exam
Total		16	
The total amount of compulsory components		66	
The total amount of optional components		24	
THE TOTAL AMOUNT OF EPP		90	

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Business Foreign Language.** The purpose of studying this discipline is to form in students the skills and abilities of business communication in a foreign language at the level of an autonomous experienced user (C1), which provides the necessary communicative competence in situations of professional activity in oral and written forms; mastering the latest professional information through foreign sources.

**Methodology and Organization of Scientific Research on the Basics of Intellectual Property.** Scientific research in the field of land management affects the public product. The results of scientific research in land management are an intermediate product of production. But their role in the organization of land relations and in the economy of land use. Implementation of socio-economic and investment programs requires the training of appropriate high-skilled personnel who possess the methodology and methods of scientific research on problematic rational use and protection of land, land management, land economics and land management.

**Examination of Design and Survey Documentation.** The purpose of discipline is to develop knowledge and ownership regulations on relevant research, analysis and evaluation of land documents for compliance with legal requirements, set standards, rules, regulations for objects of expertise.

**Land policy.** The purpose of the course is to master the methodological and methodological foundations of development and implementation of a set of measures to support and ensure the development of agriculture in the system of intersectoral relations

in the national economy, as well as assess the theory of practical actions of government agencies to regulate agro-industrial production.

**Monitoring of Land Relations.** The aim of the course is to form students' theoretical knowledge, skills and practical skills in obtaining information on the current state of land resources, assessing the levels of negative impact on them, assessing soil pollution, developing scientifically sound recommendations for environmental measures to protect and restore land.

**Standardization in Topographic and Geodetic Activities and Land Management.** The main objective of the discipline is the study of procedural order of land management activities in relation to: the transfer of land ownership and provision for use of natural and legal persons; withdrawal (redemption) of land, privatization of land, the sale of land to individuals and companies, regulatory fees ground, the creation and operation of the farm, land acquisition, the formation of farms and so on.

**Regulation of the Land and Real Estate Market.** Purpose - study of, basic functioning of the land market and real estate and use the knowledge gained in practical tasks. Students should be aware of the regulatory and legal framework for the functioning of the land market mechanisms mortgage have knowledge on how the alienation of land and real estate, to be able to analyze and use information.

**Organization of Topographic and Geodetic Activities and Land Management Works.** Discipline is based on the provisions of economics that studies the scientific methods of organizing and planning production activities in the field of land management.

**Information Technology and Patenting of Scientific Research.** Discipline involves in-depth study of organizational and methodological foundations of information technology in research work, logic and stages of information research works, sources of information, design and implementation of others.

**Economics of Land Use and Land Management.** Based on objective economic laws, a system of socio-economic and environmental measures aimed at implementing the provisions of the land laws, develop the methodology and techniques of effective reasoning and rational land use and protection of various categories, forms and types of land use, administrative-territorial units, by region and country as a whole. Includes patterns and specific guidelines for the explanation of design decisions on the improvement of the territory of the administrative-territorial units, land ownership and land use, territorial organization of agricultural and other industries under the conditions of different regions and ownership of land.

## SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Land Management and Real Estate Development** is a special discipline in the training of engineers and surveyors focused on the knowledge of the nature and patterns of land management, research methods and management mechanisms.

**Monitoring of Land Use.** The purpose of the discipline is learning and gaining listeners required theoretical knowledge and practical skills in monitoring land.

**Design Engineering.** The aim of the discipline is to develop theoretical knowledge and its practical application in external and internal organization of land ownership, land use: and rational allocation of blocks, cells, working in areas of areas of perennial crops, vineyards, collective gardens, shelterbelts design, placement constructions for cattle, designing erosion waterworks, with terracing of slopes, land reclamation, etc.

**Development of Real Estate Cadastres.** The purpose and objectives is to develop an integrated system of property register which will lead to more effective management of real estate, improve property rights and open wider possibilities for the use of these rights

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will help to monitor the quality of cadastral objects and the environment, will create an objective system property taxation.

**GIS in Cadastral Systems.** Discipline involves consideration of practical applications of GIS and geodata bases of cadastral systems and the acquisition of practical skills in using GIS for automated SLC.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### ***Optional Block 1 «Land Management and Cadastre»***

**Systems of Automated Design in Land Management.** The course involves studying technologies of automation of land management process, the final result of which is a set of land-use planning documentation sufficient for further formation of land plots or other land objects. We consider the practical aspects of using special software, automated data banks and peripherals.

**Territorial planning and Spatial Development.** The course examines the trends and patterns of settlement, organization of production, the functioning of the urban economy, social services, urban transportation systems, street and road network and their components, systems of engineering equipment and engineering site preparation, landscaping, landscape architecture. The modern urban ecology issues and resource conservation are reviewed. We study the principles of development planning, management of space resources to meet the needs of the population and the economy.

**Management of Quality of Land Surveying Works.** The aim and purpose of discipline is the development of socio-economic activities in the program, project and working land documents that would ensure sustainable use and protection of land, the creation of the environment and improve the natural landscape with the introduction of the scientific organization of labor in the land management process, improving the quality of practical solutions and project documentation as a whole.

**Standardization in Land Management and Cadastre.** The purpose of discipline is: development of general knowledge on standardization and regulation of land management to conserve land resources, soil fertility, implementation and development of sustainable land use, land protection and protection of the environment in general, the definition of the main goals and objectives in the regulation of anthropogenic pressures on ecosystems is general and land resources partially, the definition of the structure and mechanisms of formation and functioning of standardization and regulation system (SRS), the definition of priorities for creating SRS, ensuring governance in process of creation and revision of existing international, national and industry standards and regulations regarding sustainable land management, land use and land protection.

##### ***Optional Block 2 «Land Conservation»***

**Formation of agrolandscapes.** The purpose of the study of the course - the mastery of general Theoretical Foundations of environmentally sustainable agricultural landscapes, the development of methodological approaches to the assessment and prediction of agricultural landscapes, the practical application of technology design and ameliorative soil-dimensional structure of agricultural landscapes.

**Evaluation and Forecast of Land Quality.** Purpose of the discipline - the development of modern methods of assessing the quality of land, the forecast change their state under the influence of natural and anthropogenic factors, basis for the preservation and restoration of ecological values of natural and acquired qualities of land on different natural and economic conditions of areas of land use.

**Land Use Control.** Measures system in the field of land protection: regulation and control, protecting land from harmful human impact, improve soil fertility, standardization.

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Engineering methods of agricultural landscapes constructing. Technology for the land protection of from degradation processes. Regulations in the field of land protection and reproduction of soil fertility. Land protection in forest and water management; land protection of environmental and other purposes.

**Formation of Restrictions and Burdens in Land Use.** The course is designed to help students acquire theoretical knowledge and practical skills to solve problems related to the formation and effective functioning of the institution of restrictions on land use and encumbrances on land rights. In particular, the theoretical and methodological foundations of their formation, providing scientifically sound proposals for improving regulatory and legal support for their effective functioning. During the course, applicants learn methodological approaches to the assessment of lost income and compensation for losses and damages caused by restrictions on land use. Applicants master the features of planning and design of territorial restrictions on land use in land management schemes and projects, as well as the procedure for registration of territorial restrictions on land use, land plots within the State Land Cadastre.

*Optional Block 3 «GIS in land management»*

**Geoinformation Modeling.** The course provides learning basic programming skills in C++.

**Methods of Remote Sensing.** Discipline involves consideration of remote sensing techniques and the possibilities of using contextual interpretation of results in problems of territory management and monitoring.

**Geospatial analysis.** Discipline provides theoretical background of geoinformation analysis and spatial modeling in GIS. There are geographical models of the real world, types of spatial data analysis, principles and technologies of neighborhood analysis, as well as distance analysis, analysis of attributes, reclassification, overlay operations, analysis of location of objects, change detection analysis, statistical surfaces within the course. Theoretical basis and practical application of global and local interpolation methods are reviewed.

**Integration of GIS, RS and GNSS in Geosystem Monitoring.** Discipline provides theoretical basis and practical skills of integration various geospatial data including remote sensing information and GNSS data in GIS, principles of geomodeling to serve soil rational use and soil conservation as well as monitoring of agricultural resources.

*Optional Block 4 «Evaluation of Land and Property»*

**Information Supply of Land Evaluation.** The aim of the course - mastering future specialist surveyors nature of information aspects land evaluation and use of information technologies in the implementation of evaluation. Determination of the real, fair value is essential for taxation and privatization of land and property transactions about the land and rights of its lease on the secondary market. In addition, the value of land is required for the development and implementation of investment projects, obtaining loans secured by real estate.

**Registration of Real Property Rights.** Purpose – to study methods of registration of title to land is required at the conclusion of civil agreements on land, including-sales transactions, rent relations, for the purposes of monitoring – monitoring system as the rights of ownership of land in order to timely detect changes in their assessment, prevention and elimination of negative effects, as well as public accounting.

**Cadasters of Natural Resources.** The content and methodological support of the discipline is aimed at developing students' knowledge and practical skills about forming database of natural resources cadasters (including water, forests, territories and objects of

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nature reserves, spas, etc.), their use in solving problems of local territories management and individual land use.

**Valuation of Land and Real Estate.** Purpose – to learn to identify the objective market value of the property, which usually depends on the type of the property, the location of the property, the cost of construction of similar facilities, the general level of prices, the market situation.

*Optional Block 5 «Geodetic-Cartographic Technologies in Land Management»*

**Computer Technology in Cartography.** The task of the discipline dates required theoretical knowledge of modern computer technology to teach methods of their use in the creation and design of maps, acquire skills and abilities while learning specialized software products that are used in the creation of cartographic products used in land surveying; familiarize students with technological features phases of cartographic products (plans, drawings and maps).

**Geospatial Data Infrastructure.** Content of the discipline is intended to form an idea of the national spatial data infrastructure (NSDI), its structure, purpose, function, the need to fill it, and its role in the production problems related to land management. The features studied are related to legal and institutional framework for the establishment and development of NSDI to ensure the functioning of the production, updating, processing, storage, delivery and use of geospatial data in various spheres of society and state, expansion of the modern geospatial products and services, and integration into the European spatial data infrastructure (INSPIRE).

**Topographic, Geodetic and Cartographic of Land Management.** The task of the discipline: to give information on the current legal and organizational framework for the establishment and development of national infrastructure geospatial data gain skills and ability to use geospatial data in land management.

**Natural Resource Mapping.** Classification of thematic maps and ways to design legends according to their types are shown. The possibilities to display various objects, processes and phenomena through different ways of map image are explained. The main methods of creating thematic maps, the basic content of their ways and their conclusion and approval are reviewed. During laboratory classes, students fix theoretical knowledge and gain practical skills for the creation, analysis and evaluation of thematic maps with the QGIS software.

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## **FACULTY OF ECONOMICS**

**Dean** – Professor, Doctor of Economics Anatolii Dibrova

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Location: Building № 10, Room 301

Faculty organizes and coordinates educational process of master training in educational programs within specialties:

### **Specialty 051 "Economy"**

#### ***Educational program "Economics of enterprise"***

Guarantor of the educational and professional program – Professor, Doctor of Economics Oleksandr Yermakov

#### ***Educational program "Applied Economics"***

Guarantor of the educational and professional program – Professor, Doctor of Economics Natalia Vdovenko

Graduating departments:

#### **Economics**

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Head of Department – Professor, Doctor of Economics Viktoriia Baidala

#### **Organization of business and stock market activity**

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Head of Department – Professor, Doctor of Economics Mykola Ilchuk

#### **Global Economy**

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Head of Department – Professor, Doctor of Economics Natalia Vdovenko

### **Specialty 071 "Accounting and Taxation"**

#### ***Educational program "Accounting and Audit"***

Guarantor of the educational and professional program – Professor, Doctor of Economics, Ievheniia Kaliuga

Graduating departments:

#### **Accounting and Taxation**

Tel. :( 044) \_527-83-61

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Head of Department – Professor, Doctor of Economics, Liubov Hutsalenko

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**Statistics and economic analysis**

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Head of Department – Professor, Doctor of Economics Inna D. Lazaryshina

**Specialty 072 "Finance, Banking and Insurance"**

***Educational program "Finance and Credit"***

Guarantor of the educational and professional program – Professor, Doctor of Economics Lybov Khudoliy

Graduating departments:

**Finance**

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E-mail: kafedfin@ukr.net

Head of Department – Professor, Doctor of Economics Nadiia Davidenko

**Banking and Insurance**

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E-mail: banking\_chair@nubip.edu.ua

Head of Department – Professor, Doctor of Economics Lybov Khudoliy

**Specialty 076 "Entrepreneurship, Trade and Exchange Activities"**

***Educational programs "Entrepreneurship, Trade and Exchange Activities"***

Guarantor of the educational and professional program – Associate Professor, Ph.D. in Economics, Liubov Pankratova

Graduating department:

**Organization of business and stock market activity**

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E-mail: organizing\_chair@nubip.edu.ua

Head of Department – Professor, Doctor of Economics Mykola Ilchuk

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**Training of masters of sciences  
in branch of knowledge "Social and Behavioral Sciences"  
in specialty 051 "ECONOMY"  
educational program "ECONOMICS OF ENTERPRISE"**

Form of Training:	Licensed number of persons:
– Full-time	85
– Part-time	85
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Economics graduates

**The concept of training**

The transition to the market economy, reforming property relations necessitated a radical restructuring of curricula, sending them to deepen the content and quality of professional education.

In addressing this important task is to promote the introduction of a higher speed training school.

Master stage of training in economics differ qualitatively new curricula and programs, innovative forms of educational process, which focused on providing a high level of theoretical knowledge, directly involved in the research and testing of their results in practice, mastery of scientific and methodological foundations of educational activities .

Master of Economics should be an expert with the general level of education and culture to the international standard that has sufficient intellectual capacity to a wide selection of specific areas of practice.

**Educational and professional program of master's training**

Increasing the efficiency of agricultural business is an important direction of economic growth of the national economy of Ukraine. This is hampered by the fact that agricultural production continues to be irrationally exploited by agrarians of natural resource, labor and production potential. The efficiency of resource utilization depends on a considerable number of various organizational, economic, technical and financial factors, which necessitates the need for a real justification of each investment project of a new or existing enterprise. Foreign and domestic experience convincingly shows that in a market environment of stable success cannot be achieved without doing business planning. It helps to allocate the priorities of management efforts, rationally allocate the necessary resources and optimize the economic performance of the enterprise. Economists of high skill must address these questions. The reform of the Ukrainian economy, its transition to market principles of operation require the development of new directions of economic science and practice. In these circumstances, the successful development of the agricultural sector is based on competent and competent study of market requirements, creation and organization of production of competitive products, which ensures high profitability. At the same time, the overall sectorial approach has important advantages over traditional projects and programs, as it increases the responsibility of the contractor in studying the problem at regional and national levels; more fully takes into account aspects of economic policy and state regulation. At the same time, it is necessary to cultivate in

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the masters sufficient standards of public responsibility, which in the future will form adequate institutional and administrative capacity to formulate, implement and coordinate common sectorial programs. The concept and overall purpose of this program reflect the objective need to increase the economic efficiency and effectiveness of the country's agricultural sector. There is now a great need to train a highly intelligent, knowledgeable specialist in the field. Masters must learn how to take initiative and solve social and personal problems. Formerly a production-oriented system, it is now turning into a system aimed at generating income and raising the standard of living of the rural population.

### Areas of employment of graduates

Managers and assistants economic departments of enterprises, associations, companies, etc. APC system. Head of village councils, specialists of district and regional directorates of agriculture administration. Agricultural enterprises of various forms. Enterprises serving the areas of the APC. Head of village councils, specialists of district and regional directorates of agriculture administration.

### Practical training

Teaching and research farms NUBiP Ukraine; advanced enterprise, association, firm AIC system of Ukraine, etc.

### Proposed Topics of Master's qualification Thesis

1. The development of agribusiness in the region and increase its efficiency.
2. Organization and prospects of agricultural enterprises.
3. Organization and economic efficiency of logistics farms.
4. Improvement of the forms of production maintenance of agricultural enterprises.
5. Socio-economic principles of sustainable rural development.
6. Improving forms of service production farms.
7. Formation and economic efficiency of sub grain products.
8. The formation and effective functioning of milk in the complex.
9. The economic mechanism of functioning of regional stock market agricultural products.
10. Features of formation and development of the stock market agricultural products in Ukraine.

### Curriculum of Master training in educational program "Economics of enterprise" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of specialty</b>			
CC 1	Methodology and organization of scientific research	4	exam
CC 2	Agricultural policy	4	exam
<b>Total</b>		<b>8</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
<b>Compulsory components of specialty</b>			
CC 3	Managerial Economics	5	exam
CC 4	Project management	5	exam
CC 5	Global economy	5	exam
CC 6	Modeling in management of production systems	5	exam
<b>Total</b>		<b>20</b>	
<b>Compulsory components of EPP</b>			
CC 7	Business Planning entrepreneurship in agriculture	5	exam
CC 8	Corporate Social Responsibility	5	exam
CC 9	Competitiveness	5	exam
CC 10	Economics of production	5	exam
CC 11	Preparation and defense of master's qualification thesis	4	
CC 12	Internship	10	
<b>Total</b>		<b>34</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
OC 1	Optional subject 1	5	exam
OC 2	Optional subject 2	5	exam
OC 3	Optional subject 3	5	exam
OC 4	Optional subject 4	5	exam
<b>Total</b>		<b>20</b>	
<b>The total amount of compulsory components</b>		<b>62</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE**

**Compulsory components of specialty**

**Methodology and organization of scientific research.** Purpose of the course - mastering modern theoretical concepts of research, their practical application in their research and to familiarize students with the basics of intellectual property.

The object of study - methodology and research methods, methods of organization, and economic, organizational and financial principles of intellectual property in the domestic and international practice. Knowledge of the subject "Methodology and organization of scientific research with the basics of intellectual property" masters needed for research and writing of master works.

The main objective of the course is to prepare specialists in economics to conduct independent research.

**Agricultural policy.** Educational discipline enables master methodical and methodological foundations of development and implementation of measures to support and ensure the development of agriculture in the system of linkages in the national economy, and assess from the perspective of the theory of action-state structures for the regulation of the agricultural production in the country.

The main objectives of the discipline is to acquire basic knowledge on the economic substance, character and principal components of agricultural policy; analyze the effectiveness of the bodies and institutions of agricultural policy, through various market-policy instruments; understand the features of formation of agrarian policy in countries with different levels of socio-economic development, characterized agricultural policies of individual countries and blocs.

**SPECIAL (PROFESSIONAL) TRAINING CYCLE****Compulsory components of specialty**

**Managerial Economics** course "Managerial Economics" is aimed at getting students the knowledge and skills of decision making for strategic business development, business management in a competitive environment, risks and vicissitudes of the economic environment. Knowledge received as a result of the discipline will help to understand and interpret the economic reality and the mechanisms of modern economy, and facilitate the practical use of economic information and its skillful handling. The main issues of discipline are named: operational management of small and medium enterprises; corporate finance and their use; the competitiveness of enterprises; market analysis and market research; personnel management, cost, quality; Insurance and risk in business, logistics; project management; strategic management; Managerial Accounting; brand management; negotiation; PR; lobbying; economic regulation and competition policy; Labor Law; corporate social responsibility.

**Project Management.** The purpose of discipline is to develop in students the necessary theoretical knowledge and practical skills in project management methodology, which is a promising area of management theory and is becoming more common in all areas, and master the appropriate tools for successful project management of information of different types and species. The objective of discipline is learning major theoretical, methodological and organizational foundations of project management; familiarization with the features, principles and objectives of project management in the field of information; practical skills an information system project management among MS Project.

**Global Economy.** The purpose of discipline is the training of highly qualified specialists through formation of students' understanding of the conditions and factors of development, mechanisms and tools of the global economy, the realization of their intellectual mission for balanced decision-making in the context of civilizational progress. The main task - to learn and play at the professional level systematic knowledge of the global economy and to master professional skills formation strategies of economic development under the current transformation processes of globalization. Modeling in management of production system.

**Compulsory components of EPP**

**Business Planning entrepreneurship in agriculture.** The purpose - formation of a system of knowledge on the methodology of development of business plans of enterprises and monitoring their performance. Objective: To study the theoretical principles of business planning of agricultural enterprises and practical skills to develop business plans and evaluating the effectiveness of business projects.

**Corporate Social Responsibility.** Formation of basic knowledge of theory and practice of social responsibility of professional competence, learning theoretical principles and practices of cooperation between the state, business, society and the rights of CSR.

**The competitiveness of enterprises.** The goal of discipline is to form student's theoretical knowledge and practical skills for managing competitive businesses in the current economic conditions. The task - studying the theory of domestic and international experience and management competitiveness of enterprises.

**Economics of production.** Purpose of the topic - mastering the subject, methods and relationships discipline "Economics of production" in market conditions. Students should note that the subject of discipline is to identify specific forms of manifestation of economic laws of functioning and development of social production in the business sector in a market economy. Economics of production based on the general economic laws that are studied in the disciplines of macro - and microeconomics.

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**Optional components of EPP**  
***Free choice according to specialty***

*Optional Block 1*

**Economics of development.** The concept of system and development. Principles of systems formation. Mechanisms of system stability. Fundamental principles of functioning and development of economic systems. Dynamics of economic processes. Feedback action. Harmonized influence of information emergent and synergetic factors on the development of economic systems.

**Economic potential of agrarian formations.** Formation of a system of theoretical and applied knowledge about methods and processes of management of formation, functioning and development of economic potential of agrarian formations as a balanced socio - economic system.

**Public Procurement.** Studying system possibilities, implementing tender the process of electronic public and public procurement in Ukraine, the Prozorro information and telecommunication system, public procurements and features of accredited private trading platforms for Prozorro for public procurement, participation in international tenders in accordance with the WTO Agreement on Government Procurement (WTO GPA).

*Optional Block 2*

**Risk assessment in agribusiness.** Features of identification and manifestation of risks in agribusiness, characterization of their types, criteria for classification of agrarian risks, taking into account the specificity of agribusiness. Invariant methods of risk assessment and management in agriculture, the variety of types and instruments of risk coverage most commonly encountered in agribusiness.

**Economics of agro industrial formations.** Scientific aspects of agricultural resource potential for sustainable production. Status and trends of agricultural production. Increasing economic efficiency farming industry in innovation-based economic nature, character and main components of agricultural resources, ways to improve agricultural production in an innovative manner.

**Economics of the food industry.** Basic rational combination and efficient use of all elements of the production process at the level of food industry enterprises. Economic mechanism of functioning of the enterprises of the branch. Formation and utilization of resource potential in order to optimize economic performance of food industry enterprises.

*Optional Block 3*

**Economics and Human Resources Management.** The situation of the labour market is analyzed, issues of labour potential development, effective formation of the internal market of labour, selection and adaptation of staff, effective HR management, social protection, incite to professional development and resolution of labour conflicts.

**Social and solidarity economy.** The purpose of the study of the discipline "Social Economy" consists in the formation of fundamental knowledge on the theory and practice of social entrepreneurship, its fundamental differences from traditional types of business and the competitive advantages of the enterprises of interest. Familiarity with different types of social enterprises, their organizational forms and business models. The main objective of the course "Social Entrepreneurship" is to get the participants a set of knowledge and skills necessary for the effective launch of their own social business or participation in social projects.

*Optional Block 4*

**Rural Economic Governance.** Examines basic approaches, models, regulatory and administrative and instrumental support for territorial community creation processes,

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activities of local governments and executive authorities, capable of ensuring the accessibility and quality of services provided by such bodies, as well as the necessary resource base, the creation of adequate material, financial and organizational conditions to ensure the implementation of local self-government bodies and delegated authority division of powers in the system of local self-government bodies and executive bodies at different levels of the administrative-territorial structure according to the principle of subsidiarity. Investigates opportunities, risks and threats to rural areas under decentralization and new approaches to regional development in the country, policies for spatial development of rural areas based on a territorially-oriented approach, taking into account EU and OECD standards, effective governance to ensure long- and medium-term planning for territorial and community development, decentralization of power, development of an effective system of local self-government, approval of basic social standards, development of a network of organizations, mechanisms and tools that contribute to the effective functioning of private and state structures in rural areas.

**Stock market.** Discipline studies the organization and functioning of the stock market system as the main driving units and a market economy. The purpose of the study course - to give future specialists agrarian theoretical basis and practical skills of exchange activities and effective use of exchange operations in its future activities.

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**Training of masters of sciences  
in branch of knowledge "Social and behavioral sciences"  
in specialty 051 "ECONOMY"  
educational program "APPLIED ECONOMICS"**

Form of training:	Licensed persons:
- part-time	85
Training period:	
- part-time	1 year 4 months
ECTS credits:	
- educational-professional program	90
Teaching language	Ukrainian, English
Qualification of graduates	Master of Economics

**The concept of training**

The transition to a market economy, the reform of property relations caused the need for a radical restructuring of curricula, sending them to deepen the content and improve the quality of vocational education.

The solution of this important task should be facilitated by the introduction of advanced training in the system of higher education.

The master's stage of training of specialists in economics distinguishes qualitatively new curricula and programs, innovative forms of organization of the educational process, which are oriented on ensuring a high level of theoretical training, direct participation in conducting scientific research and approbation of their results in practical work, mastering scientific and methodological foundations of pedagogical activity .

The Master of Science in Economics must be a specialist in the general level of education and culture at the level of the World Standards, which has sufficient intellectual potential for a wide range of specific areas of practical activity.

**Educational and professional program of master's training**

The purpose of the educational and professional program is to form the ability of a future specialist to dynamically combine knowledge, skills, communication skills and capabilities with practical activities and responsibilities when solving problems and problems in the field of increasing the competitiveness of agrarian business, modeling the future development of the agrarian sector on the basis of relevant agro-political scenarios solutions of the model "AGMEMOD".

**Areas of employment of graduates**

The employment of graduates of the Regional Economy program is the following:

- directors of departments and heads of departments of central executive bodies;
- heads of united territorial communities;
- Top-managers of leading companies.

**Practical training**

The program provides for the obligatory condition of passing of educational and industrial practice in central executive authorities, agricultural enterprises.

**Proposed Topics of Master's qualification Thesis**

1. Development of agrarian business in the region and increase its efficiency.
  2. Organization and prospects of development of agricultural enterprises.
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3. Organization and economic efficiency of material and technical support of agricultural enterprises.
4. Improvement of forms of production service of agricultural enterprises.
5. Socio-economic bases of sustainable development of rural territories.
6. Improvement of forms of production service of agricultural enterprises.
7. Formation and economic efficiency of grain product subcomplex functioning.
8. Formation and efficiency of functioning of dairy products under the complex.
9. Economic mechanism of functioning of the exchange regional market of agricultural products.
10. Features of the formation and development of the exchange market of agricultural products in Ukraine.

**Curriculum of Master training  
in educational program "Applied Economics"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of specialty</b>			
CC 1	Methodology and organization of scientific research	4	exam
CC 2	Agricultural policy	4	exam
<b>Total</b>		<b>8</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of specialty</b>			
CC 3	Managerial Economics	5	exam
CC 4	Project management	5	exam
CC 5	Global economy	5	exam
CC 6	Modeling in management of production systems	5	exam
<b>Total</b>		<b>20</b>	
<b>Compulsory components of EPP</b>			
CC 7	Business management	5	exam
CC 8	Economics of production	5	exam
CC 9	Enterprise planning and organization	5	exam
CC 10	Applied Software Solutions in Economics (Agmemod)	5	exam
CC 11	Preparation and defense of master's qualification thesis	4	
CC 12	Internship	10	
<b>Total</b>		<b>34</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
OC 1	Optional subject 1	5	exam
OC 2	Optional subject 2	5	exam
OC 3	Optional subject 3	5	exam
OC 4	Optional subject 4	5	exam
<b>Total</b>		<b>20</b>	
<b>The total amount of compulsory components</b>		<b>48</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

## Annotations of subjects in the curriculum

### GENERAL TRAINING CYCLE

#### Compulsory components of specialty

**Methodology and organization of scientific research.** Purpose of the course - mastering modern theoretical concepts of research, their practical application in their research and to familiarize students with the basics of intellectual property.

The object of study - methodology and research methods, methods of organization, and economic, organizational and financial principles of intellectual property in the domestic and international practice. Knowledge of the subject "Methodology and organization of scientific research with the basics of intellectual property" masters needed for research and writing of master works.

The main objective of the course is to prepare specialists in economics to conduct independent research.

**Agricultural policy.** Educational discipline enables master methodical and methodological foundations of development and implementation of measures to support and ensure the development of agriculture in the system of linkages in the national economy, and assess from the perspective of the theory of action-state structures for the regulation of the agricultural production in the country.

The main objectives of the discipline is to acquire basic knowledge on the economic substance, character and principal components of agricultural policy; analyze the effectiveness of the bodies and institutions of agricultural policy, through various market-policy instruments; understand the features of formation of agrarian policy in countries with different levels of socio-economic development, characterized agricultural policies of individual countries and blocs.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components of specialty

**Managerial Economics** course "Managerial Economics" is aimed at getting students the knowledge and skills of decision making for strategic business development, business management in a competitive environment, risks and vicissitudes of the economic environment. Knowledge received as a result of the discipline will help to understand and interpret the economic reality and the mechanisms of modern economy, and facilitate the practical use of economic information and its skillful handling. The main issues of discipline are named: operational management of small and medium enterprises; corporate finance and their use; the competitiveness of enterprises; market analysis and market research; personnel management, cost, quality; Insurance and risk in business, logistics; project management; strategic management; Managerial Accounting; brand management; negotiation; PR; lobbying; economic regulation and competition policy; Labor Law; corporate social responsibility.

**Project Management.** The purpose of discipline is to develop in students the necessary theoretical knowledge and practical skills in project management methodology, which is a promising area of management theory and is becoming more common in all areas, and master the appropriate tools for successful project management of information of different types and species. The objective of discipline is learning major theoretical, methodological and organizational foundations of project management; familiarization with the features, principles and objectives of project management in the field of information; practical skills an information system project management among MS Project.

**Global Economy.** The purpose of discipline is the training of highly qualified specialists through formation of students' understanding of the conditions and factors of development, mechanisms and tools of the global economy, the realization of their

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intellectual mission for balanced decision-making in the context of civilizational progress. The main task - to learn and play at the professional level systematic knowledge of the global economy and to master professional skills formation strategies of economic development under the current transformation processes of globalization. Modeling in management of production system.

### **Compulsory components of EPP**

**Business Management.** Studying the spectrum of methods, methods and means of business management, more promising ways to achieve the tasks, automation of business using specially designed software.

**Economics of production.** Purpose of the topic - mastering the subject, methods and relationships discipline "Economics of production" in market conditions. Students should note that the subject of discipline is to identify specific forms of manifestation of economic laws of functioning and development of social production in the business sector in a market economy. Economics of production based on the general economic laws that are studied in the disciplines of macro - and microeconomics.

**Enterprise planning and organization.** Studies theoretical and practical aspects of agricultural business organization, approaches to rationalization and design of rural business structures, assists in mastering practical skills to justify design decisions, the ability to use research and organizational skills in the process of developing organizational projects for business plan writing for use in the field.

**Applied Software Solutions in Economics.** Studying the models of economic systems in a form that makes it possible to check these models for the adequacy of the means of mathematical statistics, carry out an empirical examination of the provisions of economic theory, confirming or rejecting the latter, is solely in the application of mathematics, and the theoretical provisions of which do not necessarily require empirical confirmation, the possibility of modeling the future development of the agrarian sector on the basis of the scenarios of agro-political decisions of the AGMEMOD model.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1*

**Marketing and management chain value creation.** Studying the chains of added value in the branches of economy, markets, defining the supply and demand for the products or services offered, assessing their competitiveness, developing production plans, supplying raw materials and components necessary for the production of products or services. The process of production of products and services, ending with sales in the market of sale, after-sales service taking into account the interests of all participants, is considered.

**Territorial planning and development.** Studying the structuring of the territorial and economic space and its constituent territorial entities, the territorial organization of the economy, the management of territorial development, territorial aspects of the socio-ecological and economic system of the country, the functioning of the territorial subsystems of the national economy, their individual elements and interaction between them, as well as the mechanisms of management of socio- economic development of the regions.

**Public relations and media design.** Studying the essence of the system of organization links with the target audience and its elements, patterns and randomness of their occurrence, functioning and development, principles and methods of activity in the formation and management of public opinion in the interests of the organization and the public.

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**Public Procurement.** Studying system possibilities, implementing tender the process of electronic public and public procurement in Ukraine, the Prozorro information and telecommunication system, public procurements and features of accredited private trading platforms for Prozorro for public procurement, participation in international tenders in accordance with the WTO Agreement on Government Procurement (WTO GPA).

### *Optional Block 2*

**Regional economic programs and development assistance programs.** Studying mechanisms and tools for promoting the development of territories, special forms of assistance to the economic development of territories, including them in targeted state programs, creating special regimes for them in the special economic zone; creation of territorial development agencies and private-public partnerships; conditions for effective use of special forms of assistance for the economic development of territories for certain problems and territories.

**Regional development concepts.** Studying the measures, principles, methods of state regional policy, sectorial and sectorial programs of development of regions in terms of aligning them with the strategic objectives of the state regional policy, assessing the impact of the implementation of such programs on regional development.

**Human Resource Management.** Studying the structure of the human resources management strategy, the relationship between the strategy of development and human resources management strategy, the methodology for conducting strategic analysis of the human resources of the organization, leadership capabilities, teams and organizations, human resources management strategies at different stages of development, indicators for assessing the effectiveness of strategic human resources management, and ways to increase it.

**Management of services in rural areas.** Studying the effective management of rural areas, social infrastructure of rural areas, regional and local strategies, non-agricultural economic development programs based on available resource potential and existing needs for products and services of specific rural areas, alternative types of economic activity in rural areas, in particular by raising the level of development of peoples' spheres of life, activity and life, distribution of expenditures for financing between local authorities and agricultural holdings on the basis of public-private partnership.

### *Optional Block 3*

**Management of united territorial communities.** Studying the basic approaches, models, normative-legal and managerial-instrumental support of processes of creation of territorial communities, activity of local self-government bodies and executive authorities that are able to ensure the availability and proper quality of services provided by such bodies, as well as the necessary resource base for it, creation appropriate financial, financial and organizational conditions for ensuring the implementation of local and self-government bodies by their own and delegated authorities, the division of powers in the subject local authorities and executive bodies at various levels of administrative and territorial system on the principle of subsidiarity.

**Applied econometrics.** Mastering mathematical and statistical tools of econometrics, which consists of sections: classical linear model of multiple regression and classical method of least squares; a generalized linear multiple regression model and a generalized least squares method; models and methods of statistical analysis; time series and forecasting; system of structural equations.

**Applied Economics.** The purpose is to study socio-economic, organizationally managerial, analytical, research and teaching activities in the field of applied problems in the field of economic management in the conditions of constant change. He is able to

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develop and implement management decisions in the field of industrial and agrarian business, domestic and foreign markets, labor market, financial market, in the field of environmental economics using economically mathematical methods of analysis, forecasting and modeling.

*Optional Block 4*

**Strategies and instruments of European regional policy.** Studying the theoretical approaches and practical measures of implementing the EU regional policy, tasks and mechanisms of implementation of EU strategies and instruments, European structural and investment funds, application of instruments by international organizations, European experience of implementing regional policy, reforming agrarian policy taking into account the experience of international organizations in accordance with the principles of a market economy and structural policy within the framework of the Association Agreement between the European Union and Ukraine.

**Social responsibility in the region.** Studying the formation of fundamental knowledge of the theory and practice of social responsibility from the point of view of modern standards of social policy, social reporting, business ethics and human rights in the integration of the concept of sustainable development and the acquisition of appropriate professional competences that ensure the formation of socially responsible behavior.

**Public-private partnership.** Studying methodical tools for development of public-private partnership in the region in the conditions of deceleration of the rates of globalization of economy, forms of interaction of state authorities and business structures in the implementation of public-private partnership, mechanism of realization of public-private partnership, models of the system of economic management of the region using public-private partnership, international experience of public private partnership, mechanisms of state support of public-private partnership in foreign countries, world conscious of interaction between public and private sectors.

**Municipal financial management.** Studying the general principles, methods and models of communal financial management, mechanisms and system of municipal financial management, forms and methods of administration of administrative territory and general provisions, principles of organization of the system of state power and local self-government in the administrative territory, management of socio-economic processes of the region in a market economy.

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty 071 "ACCOUNTING AND TAXATION"  
educational program "ACCOUNTING AND AUDIT"**

Form of Training:	licensed number of persons:
– Full-time	180
– Part-time	180
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master's degree in accounting and taxation

**The concept of training**

Modern development of market relations requires from experts in accounting and taxation validity of professional knowledge to the world standards, creative thinking, intellectual potential for a wide selection of specific areas of practical work. This need to improve current systems of training in accounting and taxation is urgent need for restructuring curricula, targeting them for deepening the content and improve the quality of professional education, research teaching methods of major disciplines in training.

Master stage of training in accounting and taxation distinguish qualitatively new curricula and programs, innovative forms of educational process, which focused on providing a high level of theoretical knowledge, directly involved in the research and testing of their results in practice, mastery of scientific and methodological foundations of educational activities.

Master of accounting and taxation must be an expert with the general level of education and culture to the world standards, which has sufficient intellectual capacity to a wide selection of specific areas of practice, to be able to use modern techniques to investigate the object highlight system elements, define their essential parameters and characteristics, form a model system, make it rational management influence, make proposals for improving the activity of enterprises.

The defining features of the master should research approach to the analysis of the research subject, the ability to quantitatively and qualitatively assess the impact of object classification approach to economic evaluation and control solutions results.

Master of accounting and taxation must possess not only new methods of work, but also new ideas about the management system in which they must apply.

Masters in the educational program "Accounting and Audit" aimed at training high-level professionals who can effectively analyze production and financial activities of business entities of different ownership, assess the internal potential of the company from a position of increasing the efficiency of its production and sales activities, and compliance capabilities and threats to the environment, to explore domestic and foreign markets, to determine an estimate of his situation, ensuring rational strategic development of the company.

**Educational and professional program of master's training**

Provides research trends and patterns of development of accounting in Ukraine in

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terms of its principles for reforming the international standards and requirements of the institutions of the European integration; methods and accounting organization of objects: non-current and current assets, equity, long-term and current biological assets, long-term and current liabilities, payments to the tax system, expenses and income for the activities; Financial Statements; managerial cost accounting and calculation of cost of production in crop, livestock, auxiliary industries; control, audit and analysis of real assets, liabilities and activities of processes using computer technology.

Provides research information and analytical system of socio-economic development of the financial sector and the financial corporations sector not as an indicator of adaptive ability of the enterprise to current economic conditions. The possibility to develop and implement a flexible development strategy of economic activities through the effective use of information in terms of post-industrial development becomes functional role of productive resources. The possibility of improving the accounting information using the possibilities of the theory of knowledge, based on analytical control functions.

### **Areas of employment of graduates**

Chief accountant, deputy chief accountant, senior accountant, the first category accountant, the second category accountant, accountant (with specialist degree) in agricultural business? researcher (information analyst), accounting analyst, analyst of consolidated information, analyst of lending.

### **Practical training**

Practical training is carried out on the basis of the following companies: NUBiP of Ukraine "Velykosnitynske educational and experimental farm named after O.V. MUZYCHENKO"; NUBiP of Ukraine "Agronomic Research Station"; NUBiP of Ukraine "Teaching and Research Farm "Vorzel"; NUBiP of Ukraine "Boyarka Forestry Experimental Station"; NUBiP of Ukraine Nemishaevo Agricultural College; Ltd Agroindustrial company "Mriya"; company «Mazars Ukraine»; Consulting company EBS; other bases of practical training of university students from among leading institutions, enterprises, organizations of any ownership in Ukraine and abroad, with appropriate conditions for the practice of students in accordance with the requirements of education and professional training programs.

### **Proposed Topics of Master's qualification Thesis**

1. Accounting and analytical support in the management of fixed assets.
  2. Accounting and analytical support in the management of current biological assets.
  3. Accounting and analytical support in the management costs of agricultural enterprises.
  4. Accounting, control and analysis of production costs of crop production.
  5. Accounting and internal business control production of finished products.
  6. Balance sheet of the bank, its preparation method and analysis.
  7. Reporting budgetary institutions, organization and methods of assembly.
  8. Accounting and internal business control equity.
  9. Method of accounting and control of formation and use of income.
  10. Accounting and internal business control efficiency of bank loans.
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**Curriculum of Master training  
in educational program "Accounting and Audit"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Methodology and organization of scientific research	5	exam
CC 2	Agrarian policy	5	exam
<b>Total</b>		<b>10</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Tax management	5	exam
CC 4	Accounting in business management	5	exam
CC 5	Financial analysis	5	exam
CC 6	Accounting and financial reporting by international standards	5	exam
CC 7	The organization and methodology of the audit	5	exam
CC 8	Accounting organization	5	exam
CC 9	Strategic analysis in enterprise management	5	exam
CC 10	Electronic document management	5	exam
CC 11	Educational practice (special training)	2	
CC 12	Internship	8	
CC 13	Preparation and defense of master's qualification thesis	6	
<b>Total</b>		<b>56</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
OC 1	Optional subject 1	4	exam
OC 2	Optional subject 2	4	exam
OC 3	Optional subject 3	4	exam
OC 4	Optional subject 4	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE  
Compulsory components of EPP**

**Methodology and organization of research.** The purpose of discipline: the development of knowledge on the methodology, theory method and the research process, methodological support research activities at the stages of writing a master's thesis, forming the ability to organize scientific research an issue using the whole complex of traditional methods of research, including general and special methods , The main objective of the theoretical part of the course is to familiarize students with modern concepts of scientific work, on the basis of the methodology of scientific knowledge and methods of research. The main task of the practical part - developing skills for self-education, development of skills formation and use of conscious methodological position of scientific research. As a result of the development of the course, students should improve



their ability to search, selection and processing of scientific information in the exact formulation of the problem, goals, objectives, object, object methods. Is expected to introduce students to the basics of intellectual property and directing them to master knowledge and skills regarding registration of ownership, protection, commercialization, valuation and management.

**Agrarian policy.** The discipline introduces the principles of formation of policy in agrarian sphere, gives the possibility to gain proficiency in methodical and methodological principles of the development and realization of the complex of actions concerning support and provision of the development of agriculture in the system of inter-branch links in national economy as well as estimate from the theoretic position practical actions of state structures concerning regulation of the agricultural production of the country. Both national and foreign experience is studied. In case of mastering the material students get the possibility to form their own view on professional base about processes and phenomena happening in agrarian sector of the state economy.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Tax management.** Theoretical and organizational principles of fiscal management. The accounting work in the bodies of DPS. Control and verification work of the DPS.

**Accounting in business management.** Study of the conceptual foundations use accounting as an information source for business management; acquiring skills building and transformation of the accounting system management.

**Financial analysis.** The study of organizational forms of financial analysis and its use in the management of information enterprises; methodology and organization of internal and external financial analysis solvency, liquidity, financial stability, cash and cash flow, capital efficiency of the company.

**Accounting and financial reporting by international standards.** Conceptual framework of international financial reporting standards (IFRS). The main provisions of the IFRS. Sectoral features of IFRS accounting and special accounting rules for individual business transactions.

**Accounting organization.** Studying the principles and process accounting and establishing accounting and control and intelligence, targeted information support management decisions.

**The organization and methodology of the audit.** The study of the theoretical foundations of functioning as an independent audit of financial control in Ukraine; regulatory acts governing auditing and banking, practical skills in organization, planning and auditing procedures.

**Strategic analysis in enterprise management.** The study of the nature, trends and role of strategic analysis at the enterprise, methods of analysis at the company, production program analysis methods, capital structure, financial programs and investments. Acquiring the skills of analysis and evaluation capacity of the enterprise as a factor of development strategy.

**Electronic document management.** The study computer technology in modern accounting, analysis and audit, formation of skills aimed at obtaining systematic knowledge about the information technology used in accounting, and use this knowledge to solve specific problems in the field of accounting and tax accounting and auditing.

#### **Optional components of EPP**

##### ***Free choice according to specialty***

**Internal, external control and risk management** Internal and external control of financial and economic activities, control of equity and liabilities, control of income,

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expenses and financial results. Identification, assessment of risks according to the criteria of probability of occurrence and significance of their impact on the ability of economic entities to perform certain tasks and functions to achieve their goals (mission) and objectives.

**Accounting Forensic examination.** The main provisions SBUs, research methods, output SBUs, methods of research operations cash, material values, wages, production and marketing of agricultural products, as well as payments for taxes.

**Public Procurement.** Basic Principles of Public Procurement; methodological bases of organization of procurement activity in the electronic ProZorro Procurement System; order of formation and main functions of the tender committee; rights and responsibilities of members of the tender committee; formation of tender documentation; peculiarities and specifics of the procurement of selected items; appeal of procurement procedures in the field of public procurement, control over observance of legislation in the field of public procurement; responsibility for breach of procurement law.

**Professional ethics and professional independence of accountant and auditor.** The acquisition of theoretical knowledge of professional values and guidelines of professional codes of ethics; mastering practical skills in applying knowledge of ethical provisions in practice; acquaintance with the ways of solving ethical conflicts; the internal desire to adhere to laws and regulations, the Code of Ethics.

**Global Economy.** The purpose of discipline is the training of highly qualified specialists through formation of students' understanding of the conditions and factors of development, mechanisms and tools of the global economy, the realization of their intellectual mission for balanced decision-making in the context of civilizational progress. The main task - to learn and play at the professional level systematic knowledge of the global economy and to master professional skills formation strategies of economic development under the current transformation processes of globalization.

**Analytical substantiation of managerial decisions.** Scientific and theoretical foundations of analytical substantiation of managerial decisions. The variability of managerial decisions and the choice of alternative, taking into account the analytical assessment of the conditions of operation of enterprises, their tactics and development strategies. Analytical substantiation of managerial decisions taking into account risks. Consideration of resource, social and environmental constraints in the analytical substantiation of managerial decisions.

**Business social analysis.** The problems of the level and quality of life, economic activity, accessibility and quality of social services and education. In the population targeted by socio-economic research is the work of enterprises, regional and municipal development, social activity of state and public organizations.

**Strategic Management Accounting.** The concept of strategic management and strategic management accounting. Costing by activity. Comprehensive cost management. Calculation of costs for the entire life cycle of the product. The cost of quality. The system of "just in time" and its impact on accounting. Future decisions on pricing. Economic pricing model. Pricing on a "cost plus". Pricing based on the cost of time and materials.

**Applied Econometrics.** Forming in future accountants modern economic thinking and special knowledge on the use of the system and process analysis, various methods of economic and mathematical modeling as a necessary basis for the development of diverse management decisions on the effective functioning and development of economic objects of varying complexity, hierarchy, and organization. Studying discipline involves acquiring students practical skills in econometric modeling of the market and optimizing the production and commercial activity of agricultural enterprises, the formation, and use of their assets, labor potential, financial resources and the search for opportunities to strengthen the financial condition of agricultural enterprises and increase their market value.

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**Training of masters of sciences  
in branch of knowledge "Management and administration"  
in specialty 072 "FINANCE, BANKING AND INSURANCE"  
educational program "FINANCE AND CREDIT"**

Form of Training:	Licensed number of persons:
– Full-time	100
– Part-time	100
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of Finance, Banking and Insurance

**The concept of training**

Training focused on in-depth study of theory and practice to ensure effective financial management of enterprises of agrarian sphere of economy, support of training experts from banking, insurance sectors for the needs of agricultural enterprises. An important direction of the program is targeting students for independent work, the development of creative activity of finding effective solutions to the problems studied, acquiring skills to the study of scientific literature, existing legislation and on this basis to acquire the ability to form internal and external financial relations, efficient use of financial management, successfully applied methodological tools of financial management.

Specialist "Finance, banking and insurance" is to obtain a high level of basic knowledge in financial management, understand the features of software and information to be able to use computer technology in the financial and economic activities of agricultural entities, to know and understand the basic principles of agrarian policy.

Theoretical knowledge of financial discipline should undergo testing directly on specific enterprises and financial institutions.

Practical training has been made to equip future masters in finance and credit practical knowledge in finance, professional skills and ability to work as heads of financial departments of companies, financial analysts, chief financial officers.

Serious attention along with professional study of financial work should be given to the study of effective methods of organization and financial management of enterprises.

Implementation of research, their implementation in practice, implementation skills to think creatively and take extraordinary decisions are urgent problem of preparing future scientific staff in finance and credit.

The purpose of the master's work is to systematize, deepening and consolidation of theoretical knowledge, their testing in production.

Formation of a new type of modern economic thinking should be directed to development initiatives, increased business activity, finding creative ways that lead to improving the lives of people in a market economy.

Effective teaching educational program "Finance, banking and insurance" is provided:

- Involvement of teaching staff qualifications;
  - The use in teaching of modern educational technologies that provide theoretical knowledge and practical skills required for the provision of financial services;
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- The use of flexible learning, individual approach to students, the possibility of combining teaching with research work in writing the Master's thesis under the guidance of the most experienced teachers qualifications;

- Holding consultation sessions, workshops financial services businesses of the agricultural sector, participation of students in scientific conferences on topical issues of the financial activities of agricultural enterprises.

Education provides training that can independently make effective decisions regarding the provision of financial services to entrepreneurs and generates qualified for Finance.

### **Educational and professional program of master's training**

In the conditions of the market economy of Ukraine, efficient use of financial resources has become of paramount importance. A rational solution to the problems of economic entities depends, first and foremost, on sound financial decisions. For financial professionals it is very important to have a methodological tool of financial management: cash flow management, method of systematic analysis of financial statements, management of profit, capital and investments, organization of internal company forecasting and planning. The purpose of OPP is to train specialists who are able to solve the main problems of financial management at the state level, which include: improvement and development of methods of public finance management, making qualified and scientifically sound financial management decisions in the field of public finance and taxation; implementation and organization of financial planning system in a financial institution; monitoring of industries and spheres of activity of enterprises, state institutions and organizations; predictive and analytical activities based on the use of modern information technologies; ensuring information and financial security of the state. There is also the formation of key competencies for students to perform the basic functions of tax management at the corporate level.

Training of specialists for the banking sector. The educational program envisages the acquisition of knowledge by students in the management of commercial bank activities taking into account the factors of the internal and external environment, as well as the organization of work of the central bank and the main directions of monetary policy. In addition, the training program provides for the study of banking services to entrepreneurs in the agricultural sector, due to the seasonality and duration of agricultural production and requires the development of specialized risk assessment tools, students gain basic knowledge of the theory and practical skills of risk management and insurance of risk management methods.

### **Areas of employment of graduates**

Managers and assistants economic financial departments of agricultural enterprises, associations, managers of banks. Leaders, assistants, managers, insurance companies, heads of financial departments of enterprises of the agricultural sector. Heads and specialists of economic, financial departments of companies, associations, managers, financial institutions, firms serving areas APK different State and local governments, public sector institutions; public non-profit organizations, charitable foundations; consulting, analytical, scientific and educational institutions; commercial organizations that cooperate with state authorities.

### **Practical training**

Teaching and research farms NUBiP Ukraine; advanced enterprise, association, firm system of Ukraine agribusiness, financial institutions and others.

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### Proposed Topics of Master's qualification Thesis

1. Loans to agricultural enterprises banks.
2. Settlement services for agricultural enterprises banks.
3. Cash flow management in the enterprise.
4. Management of financial stability of the company.
5. Insurance risk management system in the enterprise.
6. Insurance crop.
7. Mutual funds and their functioning in the international financial exchange market.
8. Features and prospects of on-line trading in global financial markets.
9. Development of long-term bank lending to agricultural enterprises.
10. Financial aspects of expert monetary assessment of agricultural land.

### Curriculum of Master training in educational program "Finance and Credit" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Methodology and organization of scientific research	4	exam
CC 2	Agricultural policy	4	exam
<b>Total</b>		<b>8</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Financial management	5	exam
CC 4	Budget management	5	exam
CC 5	Project financing	5	exam
CC 6	Financial services market	5	exam
CC 7	Management of financial readjustment Company	5	exam
CC 8	Banking management	5	exam
CC 8	Insurance management	5	exam
CC 10	Tax management	5	exam
CC 11	Preparation and defense of master's qualification thesis	4	
CC 12	Internship	10	
<b>Total</b>		<b>54</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1</i>			
OB 1.1	Agrarian risks and their insurance	5	exam
OB 1.2	Monetary policy and the National Bank	5	exam
OB 1.3	Finance Nature	5	exam
OB 1.4	Banking Management 2	5	exam
OB 1.5	Public Procurement	5	exam
OB 1.6	Global Economy	5	exam
<b>Total</b>		<b>20</b>	
<i>Optional Block 2</i>			
OB 2.1	Business Intelligence	5	exam
OB 2.2	The financial security of the state	5	exam
OB 2.3	Financial Econometrics	5	exam



Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OB 2.4	Finance Nature	5	exam
OB 2.5	Corporate Finance	5	exam
OB 2.6	International Taxation	5	exam
OB 2.7	Global Economy	5	exam
OB 2.8	Public Procurement	5	exam
<b>Total</b>		<b>20</b>	
<b>The total amount of compulsory components</b>		<b>62</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Methodology and organization of scientific research.** Purpose of the course - mastering modern theoretical concepts of research, their practical application in their research and to familiarize students with the basics of intellectual property.

The object of study - methodology and research methods, methods of organization, and economic, organizational and financial principles of intellectual property in the domestic and international practice. Knowledge of the subject "Methodology and organization of scientific research with the basics of intellectual property" masters needed for research and writing of master works.

The main objective of the course is to prepare specialists in economics to conduct independent research.

**Agricultural policy.** Educational discipline enables master methodical and methodological foundations of development and implementation of measures to support and ensure the development of agriculture in the system of linkages in the national economy, and assess from the perspective of the theory of action-state structures for the regulation of the agricultural production in the country.

The main objectives of the discipline is to acquire basic knowledge on the economic substance, character and principal components of agricultural policy; analyze the effectiveness of the bodies and institutions of agricultural policy, through various market-policy instruments; understand the features of formation of agrarian policy in countries with different levels of socio-economic development, characterized agricultural policies of individual countries and blocs.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Financial Management.** Objective: mastering the ways of solving issues of financial transactions acquainted with specific problems and contradictions of operation and cash flows methods and techniques of financial manager for the implementation of professional management of financial assets of industrial and economic activity.

The task - to learn the theoretical foundations of financial management; master the methodological tools of financial management; form the theoretical and practical knowledge about the management of financial relations arising in the course of operating and investment activity; master the basics of money management company; develop skills in analyzing financial statements; learn the basics of financial management during the bankruptcy.

Financial Services Market "Objective: preparing masters in financial management i analyze financial services with a level of training that will provide them a competitive advantage in the labor market.

Objectives: To form a systemic understanding of the relationships of different actors in the financial services market and the functioning of specialized financial institutions; learn to identify the needs of consumers of financial services in specific situations and opportunities to meet these needs different types of financial services; provide a comprehensive understanding of the role of financial services i mentioned various financial institutions in the financial market and its segments; develop skills in comparative analysis of the financial services industry with the definition of the advantages and disadvantages of different types of services; teach reasonably compare financial services and make their selection, taking into account specific needs of the consumer i financial and economic situation; show the role of state institutions in the financial services market; highlight the main priority directions of state policy in the field of regulation of financial relations in the financial services market.

**Budget Management.** The program of the course covers the theoretical foundations of management budget process: the nature of intergovernmental relations, functions of management, stages of the budget process, and the structure of organizations involved in the budget process and so on.

The aim of the course is to provide students theoretical and practical knowledge for disclosure capabilities, skills on the organization of the budget process in Ukraine and its management and execution of the state budget. Important here is the study of the nature of intergovernmental relations and the nature of their impact on society, the disclosure laws of construction and operation of the budget system, the theoretical foundations of system of financial regulation in a market economy.

**Project financing.** Purpose of discipline is to form theoretical and methodological framework necessary future professionals, fluent in practice organization and management of investment activity at the enterprises of different ownership and learn to plan, analyze and evaluate the effectiveness of business - plans for investment projects.

The study of educational material will increase the overall level of training, to form the skills of independent research and analytical study of problems from the standpoint of public and state needs and interests. The object of study - a system of methods and activities of investment firms of different ownership and management.

**Financial services market.** Objective: To prepare masters in the field of financial management and analysis of financial services with a level of qualification that will provide them with competitive advantages in the labor market. Objective: to form a systematic understanding of the interconnections of different subjects in the market of financial services and the functioning of the system of specialized financial institutions; To teach how to identify the needs of financial services consumers in specific situations and the ability to meet these needs by different types of financial services; to provide a comprehensive understanding of the role and importance of financial services of various financial institutions in the financial market and its segments; develop the skills of comparative analysis in the field of financial services, identifying the advantages and disadvantages of different types of services; to teach reasonably to compare types of financial services and to carry out their selection, taking into account the needs of the consumer and the specific financial and economic situation; to show the role of state institutions in the financial services market; To highlight the main priorities of the state policy in the field of regulating financial relations in the financial services market.

**Financial enterprises readjustment.** The purpose of discipline is to develop the students theoretical and practical knowledge on issues related to financial recovery company, managing this process, the basics of crisis management in the enterprise. The

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theoretical part of the course aims at familiarization with the concept and essence of financial restructuring, forms, terms, rules and sources of funding reorganization of enterprises, management of financial reorganization, controlling and auditing curative.

The objective of the discipline is depth study of mechanisms of management of financial readjustment; acquisition of knowledge of economic substance and procedure of financial reorganization of enterprises; meet the challenges of decision-making on sanitation; mastering methodological approaches to programming and rehabilitation plan, identify the most effective mechanisms for its implementation; identify the most effective forms and mechanisms of financial recovery of the company, financing conditions and forms of the formation of internal reorganization and external sources; acquiring knowledge on controlling and its role in the reorganization of the enterprise, rules and methods of curative audit; study the role of the state in the process of sanation and state support for the financial reorganization of enterprises.

**Banking Management.** Purpose: acquiring basic knowledge of management theory and practice of banking. Objective: To clarify the financial statements of commercial banks; explore theoretical approaches to the management of banking risks, the bank's liquidity, financial condition assessment; management liabilities; active management and fee-brokerage bank

**Insurance management.** purpose of teaching this course, forming the students' knowledge of the preparation and implementation of management decisions that ensure the efficient formation and use of the capacity of insurance companies and the harmonization of the financial interests of insurance consumers, owners and staff of insurance companies, intermediaries and the state.

The objective is to acquire sustainable knowledge students the theory and practice of management by the insurance company; insurance services; risk assessment; settlement of insurance claims.

**Tax Management.** Taxes are very complicated financial categories as they relate and reflect virtually all aspects of economic relations entities independently. The capacity of the tax system depends on the effectiveness of governance in the tax area that requires highly skilled personnel, able to participate in the development of tax laws, to tax planning, and control the correctness of calculation and timely payment to the budget of taxes and obligatory payments. The purpose of teaching this course - providing students with knowledge on taxation of necessary future specialists to manage in the field of taxation. The objective is to study the theoretical and organizational principles of tax law and management; skills control of the tax authorities, ability to explain the provisions of tax laws to solve disputable issues, submit proposals for its improvement.

### **Optional components of EPP** ***Free choice according to specialty*** *Optional Block 1*

**Agrarian risks and their insurance.** Objective: theoretical knowledge and practical skills in conceptual frameworks insurance of agricultural risks, the formation of effective organizational-economic mechanism of insurance coverage farms agricultural sector.

Subject: Economic relations arising between subjects of the insurance market in the implementation of agricultural insurance. Content modules: features of agricultural insurance, agricultural insurance experience in foreign countries, crop insurance and livestock insurance, farm buildings, machinery and other property.

**Monetary policy and the National Bank.** The formation of future professionals specialized knowledge of the organization of the central bank monetary policy implementation, the ability to use their knowledge in the performance of operations, credit related calculations, financing of investments and the provision of other services. Study of

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the National Bank of Ukraine, especially its functioning and main directions of monetary policy

**Finance Nature.** Submission, generalization idea "finance - economy - ecology" runs through concept development financial nature, demand in causing an economic category due to the fact that the modern economy is recognized as an integrated system that interacts with natural systems. Aim of the course - to submit an accessible form and help students learn the basics of finance, to understand the concept and essence of natural wealth as elements of national wealth, to analyze the concept of nature in the marketplace.

**Banking Management II.** Management of equity, deposit and non-deposit raising funds. Bank lending: policy and technique of lending, features of lending to legal entities and individuals. Investment function of the banking sector. Features of providing banking services to business entities in the agricultural sector.

**Public Procurement.** Studying system possibilities, implementing tender the process of electronic public and public procurement in Ukraine, the Prozorro information and telecommunication system, public procurements and features of accredited private trading platforms for Prozorro for public procurement, participation in international tenders in accordance with the WTO Agreement on Government Procurement (WTO GPA).

**Global Economy.** The purpose of discipline is the training of highly qualified specialists through formation of students' understanding of the conditions and factors of development, mechanisms and tools of the global economy, the realization of their intellectual mission for balanced decision-making in the context of civilizational progress. The main task - to learn and play at the professional level systematic knowledge of the global economy and to master professional skills formation strategies of economic development under the current transformation processes of globalization.

#### *Optional Block 2*

**Business Intelligence.** The purpose of discipline is to train highly qualified professionals who possess knowledge and skills in financial analysis; able to work as financial analysts in commercial and investment banks, management companies, funds, and enterprises of the real sector of the economy; can predict the processes occurring in the financial system and the real economy enterprises both in Ukraine and in foreign countries; can participate in the development of recommendations for management decisions based on analysis of the financial condition of entities.

The main objective of the course is the ability to generate analytical conclusion of the submitted information and research, namely the study of the structure of the company; acquiring skills formation business model of the company; studying the place and role of the business analyst in the enterprise; mastering theoretical foundations of successful business decisions; definition of tasks, functions and structure of business process management in the enterprise; study of business process analysis and business plan of the company.

**The financial security of the state** in the system of economic security plays an important role of the financial component, the level of which depends on the realization of national interests and sustainable economic development. The concept of financial security is important both for the state and for businesses and the public. Ensuring financial security is particularly acute during the financial crisis, accompanied by a partial loss of internal and external solvency instability of the national currency, reduction of income, inflation, decline in revenues to budgets of all levels and special funds and so on. Study of Financial Security provides the ability to act proactively and prevent crises that finance professionals can prevent the development of pre-crisis, ensuring efficient operation both at companies and in general at the national level.

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The purpose of discipline "Financial Security" is to form a knowledge system for ensuring the financial security of the state as part of the economic and national security, as well as those of its functional elements that directly affect the level of the economic system of the state in terms of global transformations.

**Financial Econometrics.** The study of economic processes (relationships) in applied econometrics carries through mathematical (econometric) model. Construct and analyze these models using actual numerical values. One of the main objectives of Applied Econometrics is the collection, processing and presentation of economic data in graphic form as tables, graphs, charts, analysis and forecasting of economic relationships.

**Finance Nature.** Submission, generalization idea "finance - economy - ecology" runs through concept development financial nature, demand in causing an economic category due to the fact that the modern economy is recognized as an integrated system that interacts with natural systems. Aim of the course - to submit an accessible form and help students learn the basics of finance, to understand the concept and essence of natural wealth as elements of national wealth, to analyze the concept of nature in the marketplace.

**Corporate Finance.** Corporate finance business finances compared to other organizational forms are most difficult internal system of operation that requires special study. The purpose of the course "Corporate Finance (Corporate Finance)" is to master the mechanisms of formation, organization, planning and financial management of joint stock companies on the basis of theoretical and practical analysis of processes of financing and lending, summarizing the provisions of relevant laws and regulations, and experience of financial and business leading foreign and domestic corporations.

**International Taxation.** The purpose - formation system of knowledge in the field of taxation in the global economy and the nature of its development today. The subject - the relationship between the actors of the world economy on the taxation of international economic activity. Content modules: the nature, conditions and problems of international taxation; identify common features and differences in tax systems of different countries of the world; study the current tax policies of different countries of the world; determining the economic aspects and theories of the international tax relations.

**Global Economy.** The purpose of discipline is the training of highly qualified specialists through formation of students' understanding of the conditions and factors of development, mechanisms and tools of the global economy, the realization of their intellectual mission for balanced decision-making in the context of civilizational progress. The main task - to learn and play at the professional level systematic knowledge of the global economy and to master professional skills formation strategies of economic development under the current transformation processes of globalization.

**Public Procurement.** Studying system possibilities, implementing tender the process of electronic public and public procurement in Ukraine, the Prozorro information and telecommunication system, public procurements and features of accredited private trading platforms for Prozorro for public procurement, participation in international tenders in accordance with the WTO Agreement on Government Procurement (WTO GPA).

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty 076 "ENTREPRENEURSHIP, TRADE AND EXCHANGE ACTIVITIES"  
in educational program "ENTREPRENEURSHIP, TRADE  
AND EXCHANGE ACTIVITIES"**

Form of training:	Licensed number of persons:
– Full-time and part-time	75
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master's degree in Entrepreneurship, Trade and Exchange Activities

**Concept of training**

Fundamentality training in the educational and professional program "Entrepreneurship, Trade and Exchange Activities " is manifested in their practice in different sectors of the economy, in particular, agriculture.

Currently, there is globalization in almost all sectors of the economy. In agriculture, Ukraine has successfully implemented new processes world-class, high-performance computer technology, more widespread and accessible information products and so on. As in industry and agriculture more attention is paid to the wide application of international projects that are not only able to selectively concentrate some advances in science and technology, but also affect the implementation of large scale agricultural production of both large and small producers, to ensure high efficiency sales activity.

Interdisciplinary knowledge of contemporary issues and trends in agricultural science, technology boom and its impact on the environment led to the need for highly qualified specialists in society not just on economics, marketing or finance, and professionals who have combined the qualifying these characteristics is required compulsory requirement for work in today's market system.

All the above clearly points to the existing or potentially high demand for specialists in business, trade and exchange activities. That is why to understand and solve the problems of relations between businesses and the market, both nationally and internationally, as well as compliance newest global trends in the distribution of resources and products through modern global technology organization is preparing the necessary relevant experts and, in particular, masters in the field of trading, which would possess knowledge about the implementation of modern technology in the exchange activities as well as knowledge of economics and finance, the legal regulation, management and marketing, security problems in agriculture and the national economy as a whole. That is urgent for the region and for the country is the organization of an integrated system of training in the field of exchange activities directly as a specific application of agricultural technologies to address problems of economic independence Ukraine.

The training of specialists of the exchange activity at level "Master" does not carry any higher educational institution of Ukraine that, based on today's needs for specialists of this sphere is unacceptable and naturally leads to serious loss of profits. In part, this problem is solved by means of educational programs of educational institutions that train specialists with in-depth knowledge in exchange activities within other economic fields. However, their knowledge does not apply to the agricultural sector, limited usually the

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stock market, and therefore are not sufficient for working on the above areas, emphasizing the uniqueness of the profession.

### **Educational and professional program of master's training**

It involves the training of highly skilled specialists capable of forming a strategy and tactics of entrepreneurship and enterprise in the field of agrarian business, identifying market opportunities, identifying, shaping and designing business trends, identifying promising directions for the development of agribusiness, and developing alternative strategies and mechanisms for their implementation. Lets prepare professionals who through effective use of the exchange market will minimize both productive and financial risks practically all spheres of economic activity.

The scope of this study program includes activities such as wholesale trade, trading securities commercial activities, evaluation activities, asset management and physical entities.

### **Areas of employment of graduates**

The heads of enterprises and business structures in the field of agribusiness, commercial directors, private entrepreneurs, civil servants in the regulatory and supervisory bodies in the field of entrepreneurship, management of production, service, consulting and trading structures in the field of agribusiness.

Employees of brokerage firms, dealing centers, investment companies and funds, asset management companies. Employees commercial enterprises and organizations,, brokerage houses, dealing centers, investment companies and funds, asset management.

### **Practical training**

All students undergo practical training in educational institutions of NUBiP of Ukraine, agroholdings, advanced agribusiness enterprises, and other entrepreneurial and commercial structures of the agro-industrial complex of Ukraine; on leading domestic exchanges, known in Ukraine and abroad, companies operating on the stock markets.

### **Proposed Topics of Master's qualification Thesis**

1. Business planning of entrepreneurial activity in the field of plant growing
  2. Business planning of entrepreneurial activity in the field of animal husbandry
  3. Business planning of entrepreneurial activity in the field of processing of agricultural products
  4. Designing the development of agribusiness in the region
  5. Development of cooperation of business structures of agribusiness
  6. Commodity exchange market: Status and Prospects.
  7. Financial derivatives and diversification of their use stock market participants.
  8. Diversification of investments on the stock exchange financial market.
  9. The development of electronic trading technology in global financial markets.
  10. Day-Trading on exchange market.
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**Curriculum of Master training  
in educational program "Entrepreneurship, Trade and Exchange Activities"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Methodology and organization of scientific research	5	exam
CC 2	Agrarian policy	5	exam
<b>Total</b>		<b>10</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Business Planning entrepreneurship in agriculture	6	exam
CC 4	Exchange market	6	exam
CC 5	Analysis and forecasting the stock market	6	exam
CC 6	Business project management	6	exam
CC 7	Competitiveness business structures	6	exam
CC 8	Commercial activity and business communications	6	exam
CC 9	Internship	10	
CC 10	Preparation and defense of master's qualification thesis	6	
<b>Total</b>		<b>52</b>	x
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
OC 1	Optional subject 1	4	exam
OC 2	Optional subject 2	4	exam
OC 3	Optional subject 3	4	exam
OC 4	Optional subject 4	4	exam
<b>Total</b>		<b>20</b>	
<b>The total amount of compulsory components</b>		<b>62</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE  
Compulsory components of EPP**

**Methodology and organization of scientific research.** The purpose of discipline: the development of knowledge on the methodology, theory method and the research process, methodological support research activities at the stages of writing a master's thesis, forming the ability to organize scientific research an issue using the whole complex of traditional methods of research, including general and special methods , The main objective of the theoretical part of the course is to familiarize students with modern concepts of scientific work, on the basis of the methodology of scientific knowledge and methods of research. The main task of the practical part - developing skills for self-education, development of skills formation and use of conscious methodological position of scientific research. As a result of the development of the course, students should improve their ability to search, selection and processing of scientific information in the exact formulation of the problem, goals, objectives, object, object methods. Is expected to

introduce students to the basics of intellectual property and directing them to master knowledge and skills regarding registration of ownership, protection, commercialization, valuation and management.

**Agrarian policy.** The discipline introduces the principles of formation of policy in agrarian sphere, gives the possibility to gain proficiency in methodical and methodological principles of the development and realization of the complex of actions concerning support and provision of the development of agriculture in the system of inter-branch links in national economy as well as estimate from the theoretic position practical actions of state structures concerning regulation of the agricultural production of the country.

Both national and foreign experience is studied. In case of mastering the material students get the possibility to form their own view on professional base about processes and phenomena happening in agrarian sector of the state economy.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Business Planning entrepreneurship in agriculture.** The purpose - formation of a system of knowledge on the methodology of development of business plans of enterprises and monitoring their performance. Objective: To study the theoretical principles of business planning of agricultural enterprises and practical skills to develop business plans and evaluating the effectiveness of business projects.

**Exchange market.** discipline studies the organization and functioning of the exchange-traded market system as the main driving units and a market economy. The purpose of the study course - to give future specialists agrarian theoretical basis and practical skills of exchange activities and effective use of exchange operations in its future activities. Course description form students with knowledge of exchange trading and operation of various types of stock market.

**Analysis and forecasting in the stock market.** The course "Analysis and forecasting in the stock market" system examines methods of assessing the situation on the stock market, the current operation and its prediction for the future. The purpose of the study course - to the future economic direction of specialist theoretical foundations and practical skills in the fundamental and technical analysis and implementation of forecasting stock market conditions and effectively use this knowledge in their future activities.

**Business project management.** The purpose of studying the course is the formation of future specialists in contemporary system thinking and a set of special skills and abilities of the use of universal tools for the development and implementation of universal projects in order to achieve the effective existence and development of the organization.

**Competitiveness business structures.** The aim is to provide students with theoretical knowledge and practical skills in managing the competitiveness of entrepreneurial structures in modern economic conditions. The subject of the study of the discipline is modern concepts and methodological approaches to assessing and managing the competitiveness of business structures.

**Commercial activity and business communications.** The essence and main tasks of commercial activity, and its legal bases, the basic organizational and legal forms of management. Building communication ties in business. Rationalization of trade management, solving problems of further improving the efficiency of technological processes and customer service.

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**Optional components of EPP*****Free choice according to specialty***

**Hedging futures and options.** Students learn theory and practice of hedging. Basis and its role in hedging. Types of hedging. Hedging strategies. Futures hedging. Options and swaps hedging. Hedging in agricultural market. Futures. Options and their essence. Options trade. Basis risks. Hedging in financial markets. Arbitrage and speculation.

**International stock markets.** The purpose of teaching is to create a system of special knowledge of the problems and prospects of development of international relations in the field of exchange trading. Tasks of the course are: formation of a holistic understanding of the processes that characterize the international level of interoperability of national stock markets; mastery of new approaches to assess the evolutionary nature of international stock markets; mastering the culture of modern economic thinking in the field of trading with the position advanced world experience.

**Pricing in the exchange market.** The purpose of discipline - to provide students with theoretical knowledge and practical skills on the formation of prices for agricultural products. Tasks of the course is to disclose problems: the theoretical foundations of pricing; legislative and legal regulation of pricing; organizational and economic mechanism of pricing; description of methods of regulation of pricing in Ukraine.

**E-Business.** The discipline provides the formation of knowledge and skills of students on the introduction of computer technologies in business, the foundations of electronic trade technologies and their use in the activities of enterprises. Objectives of the course: to master the basic concepts of e-commerce; to get acquainted with the latest information technologies; to acquire practical skills in using electronic technologies in business.

**Entrepreneurship in the field of processing of agricultural products.** The purpose of the discipline is the formation of a system of theoretical and practical knowledge about the rational organization and efficiency of conducting business on processing of agricultural products. The subject of studying discipline is a set of theoretical, methodological and practical issues on the rational organization and economic efficiency of business activities in the processing of agricultural products.

**Commercial Logistics.** The purpose of the course is to develop the competencies of future masters in scientific substantiation and to make optimal management decisions in logistics using modern information technologies. The subject of the course is the study of commercial logistics conceptual principles, the basic principles of logistics effective use in commercial practice of enterprises, the study of features of the commercial logistics functional areas development and the formation of information support for making effective logistics decisions. In the course of studying the discipline students will learn the basic approaches to the implementation of logistics as a new paradigm of entrepreneurial activity.

**Public Procurement.** Basic Principles of Public Procurement; methodological bases of organization of procurement activity in the electronic ProZorro Procurement System; order of formation and main functions of the tender committee; rights and responsibilities of members of the tender committee; formation of tender documentation; peculiarities and specifics of the procurement of selected items; appeal of procurement procedures in the field of public procurement, control over observance of legislation in the field of public procurement; responsibility for breach of procurement law.

**Global Economy.** The purpose of discipline is the training of highly qualified specialists through formation of students' understanding of the conditions and factors of development, mechanisms and tools of the global economy, the realization of their intellectual mission for balanced decision-making in the context of civilizational progress.

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The main task - to learn and play at the professional level systematic knowledge of the global economy and to master professional skills formation strategies of economic development under the current transformation processes of globalization.

**Innovative development of agricultural enterprises.** The purpose of studying the discipline is to form students' theoretical knowledge about the state and problems of innovation of agricultural enterprises. The task is to master and reproduce at the professional level system knowledge of the components and elements of the mechanism of stimulating the innovation process, institutional forms of innovative development of the agricultural sector.

## **FACULTY OF AGRICULTURAL MANAGEMENT**

**Dean** - PhD in Economics, Associate Professor Anatolii Ostapchuk

Tel.: (044) 527-85-73

E-mail: agromen\_dean@nubip.edu.ua

Location: educational building 10, room 313, 525

Faculty organizes and coordinates educational process of master training in educations programs with in specialties:

### **Specialty 073 "Management"**

#### ***Educational program "Management of organization and administration"***

Guarantor of the educational and professional program – PhD in Economics, Associate Professor Olga Gogulya

Departments in charge of graduate training:

#### **Management named after J. Zavadskyi**

Тел.: (044) 527-85-66

E-mail: manag\_chair@nubip.edu.ua

Head of department – PhD in Economics, Professor Tetiana Balanovska

#### ***Educational program "Management of foreign economic activity"***

Guarantor of the educational and professional program - PhD in Economics, Associate professor Larisa Dibrova

The graduating department:

#### **Administrative Management and Foreign Economic Activity**

Tel .: (044) 527-86-51

E-mail: worldagro\_chair@nubip.edu.ua

Head of department - Doctor of Economics, Professor Vitalii Lutsiak

#### ***Educational program "Administrative Management"***

Guarantor of the educational and professional program - PhD in Economics, Associate Professor - Olena Kovtun

The graduating department:

#### **Administrative Management and Foreign Economic Activity**

Tel .: (044) 527-86-51

E-mail: worldagro\_chair@nubip.edu.ua

Head of Department – Doctor of Economics, Professor Vitalii Lutsiak

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***Educational program "Management of investment activity and international projects"***

Guarantor of the educational and professional program - Corresponding Member of the National Academy of sciences of Ukraine, Professor, Doctor of Economics Lidiia Shynkaruk

Guarantor of the educational and research program - Corresponding Member of the National Academy of sciences of Ukraine, Professor, Doctor of Economics Lidiia Shynkaruk

The graduating department:

**Production and investment management**

Tel.: (044) 527-80-80

E-mail: [prodinvestman@nubip.edu.ua](mailto:prodinvestman@nubip.edu.ua)

Acting head of the department – doctor of economic sciences, professor Maryna Dielini

**Specialty 075 "Marketing"**

***Educational program "Marketing"***

Guarantor of the program – PhD in Economics, Professor, Oleksandr Lutsiy

The graduating department:

**Marketing and International Trade**

Tel .: (044) 527-89-78

E-mail: [market\\_chair@nubip.edu.ua](mailto:market_chair@nubip.edu.ua)

Head of department – Doctor of Economics, professor Ruslan Buriak

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty "MANAGEMENT"  
educational program "MANAGEMENT OF ORGANIZATION AND ADMINISTRATION"**

Form of training	Licensed number of students:
– Full-time EPP	60
– part-time	50
Duration of Training	
– Full-time educational and professional program	1 year and 4 months
– part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian
Qualification of graduates	Master of Management, Manager of the Organization

**The concept of training**

The educational and professional program "Management of Organizations and Administration" is aimed at providing fundamental theoretical and practical training specialists capable of solving practical problems and complex specialized tasks in the field of management of the organization and its departments. The program will promote the formation of masters of business qualities, professionalism, creativity, entrepreneurship, independence in the process of development and decision-making, organization, and willingness to work in a dynamic highly competitive environment.

**Educational and professional program of master's training**

***Optional block "Management in various organizational and legal forms of business"***

Training of specialists to manage the activities of economic entities of various organizational and legal forms. Future masters in management, choosing this block of disciplines, will gain theoretical knowledge and practical skills to increase the competitiveness of the business entity through the production of quality products or services, using a system of specific modern management tools corresponding to various organizational and legal forms of management (including cooperatives), stages of their organizational development, etc.

***Optional block "Energetic Management"***

Training of specialists in the management of rational use of energy resources. The program is aimed at training a specialist capable of solving complex problems and problems in the energy sector, creating modern energy management systems, and provides students with a higher education understanding of concepts, approaches, and criteria for defining, comparing, justifying management decisions in the field of electricity; acquaintance with the basics of energy flow management; consideration of modern theories and practices of energy resources use.

**Areas of employment of graduates**

The graduate is suitable for employment in the following positions:  
- heads of enterprises, institutions, and organizations(CEO);

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- heads of production and other main divisions;
- heads of functional divisions (including heads of financial, accounting, economic, legal, and administrative divisions and other heads; heads of divisions of personnel and social and labor relations; heads of divisions of marketing; heads of divisions of logistical supply; heads of projects and programs; heads of others functional units);
- managers of small enterprises without management staff;
- managers (managers) of enterprises, institutions, organizations, and their divisions;
- and other positions of managers, their deputies, and assistants in organizations of various forms of ownership and organizational and legal forms of management, production and non-production spheres of the economy, in public administration and local government.

### **Practical training**

Future masters in organization management and administration in specific enterprises, institutions, and organizations acquire: knowledge of production issues of the enterprise, knowledge, and skills in management decisions, innovation; ability to manage oneself and others, to influence others, to build clear personal and organizational goals, to solve problems, to teach and develop subordinates; skills of work with modern methods and technologies of management.

### **Proposed Topics of master's qualification thesis**

1. Business management.
  2. Formation of a management system in the enterprise.
  3. Adoption and implementation of management decisions in the enterprise.
  4. Formation of enterprise development strategy.
  5. Enterprise management (in various organizational and legal forms).
  6. Team Management of the enterprise.
  7. Formation and development of leadership potential of employees.
  8. Formation of a system of social responsibility of business in the conditions of modern challenges.
  9. Formation of the corporate culture of the enterprise.
  10. Formation and use of communication systems in enterprise management.
  11. Human resource management of the enterprise.
  12. The use of modern personnel management technologies in the organization.
  13. Formation of a system of motivation and stimulation of work in the enterprise.
  14. Management of enterprise competitiveness.
  15. Formation of quality management system in the enterprise.
  16. Management of the formation and use of production potential of the enterprise.
  17. Project management in the enterprise.
  18. Crisis management of the enterprise.
  19. Management of marketing activities of the enterprise.
  20. Supply chain management.
  21. Management of logistics processes in the enterprise.
  22. Digital management in the enterprise.
  23. Change management in the enterprise.
  24. Risk management in the enterprise.
  25. Management of energy efficiency incentives.
  26. Formation of energy management system in the enterprise.
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**Curriculum of Master training  
in educational program "Management of organizations and administration"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Business management	4	exam
CC 2	Psychology of management	4	exam, coursework
CC 3	Business ethics and corporate social responsibility	4	exam
CC 4	Methodology and Organization of Scientific Research with the Principles of Intellectual Property	4	exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 5	Management of enterprise competitiveness	4	exam
CC 6	Contract law	4	exam
CC 7	Modern management concepts	7	test, exam
CC 8	Project management in organizations	4	exam, coursework
CC 9	Quality management	4	exam
CC 10	Practical training	12	
CC 11	Preparation and defense of master's qualification thesis	14	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Management in various organizational and legal forms of business"</i>			
OC 1.1	Anti-crisis management of enterprises	4	exam
OC 1.2	Risk Management and Economic Security	4	exam
OC 1.3	Supply chain management	4	exam
OC 1.4	Logistics management	4	exam
OC 1.5	Digital Management	4	exam
OC 1.6	Complex quality management system of products and services	4	exam
OC 1.7	Corporate management	4	exam
OC 1.8	Management of cooperatives	4	exam
OC 1.9	Change management	4	exam
<i>Optional Block 2 "Energetic Management"</i>			
OC 2.1	Energy and resource conservation in the energy sector	4	exam
OC 2.2	Analysis and expertise of energy supply projects	4	exam
OC 2.3	Basics of energetic audit	4	exam
OC 2.4	Methods of energy efficiency analysis of energy consumption systems of production processes	4	exam
OC 2.5	Methods of energy efficiency analysis of buildings	4	exam
OC 2.6	Combined power supply systems of local facilities	4	exam
OC 2.7	Local equipment for data collection and processing in energy consumption systems	4	exam
OC 2.8	Energy management software and hardware complexes	4	exam
OC 2.9	The internet of things in energy consumption systems	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

## Annotations of subjects in the curriculum

### GENERAL TRAINING CYCLE Compulsory components of EPP

**Business Management.** Basics of business management. The concept of business and entrepreneurship. Signs and principles of entrepreneurial activity. Legal basis of entrepreneurship. Entrepreneurs. Business and management. Management in business. Types of enterprises and organizational and legal forms of management, features of their management. Organization of entrepreneurial activity. The process of creating own business. Human resource management in business. Business ethics in business. Strategic management in business development. Business planning in the business management system. Marketing in the business management system. Business information support.

**Psychology of management.** Theoretical approaches and results of practical research in the field of management psychology and conflict studies. Methods of psych diagnostics in working with individual employees and their groups in the team. Psychological features of employee behavior in the organization. The main psychological patterns of the manager as a leader of the organization, the main tools of its managerial influence. Technology of formation of organizational culture. Basic methods of self-regulation, stress management and conflict management.

**Business ethics and social responsibility of business.** Ethics is the foundation of modern business. Theoretical and methodological aspects of business ethics and its role in management. Ethical problems and violations of modern business ethics. Business ethics in Ukraine and foreign countries. Internal mechanisms of influence of business ethics on activity of organizational formations. Conceptual bases of development of social responsibility. Social responsibility in the management system of the organization. Formation of relations with employees based on corporate social responsibility. Strategy of socially responsible behavior in the market environment. Evaluation of the effectiveness of corporate social responsibility.

**Methodology and Organization of Scientific Research with the Principles of Intellectual Property.** Methodology: essence, content, concept. Problems of scientific knowledge in the history of philosophy. Dialectical and logical bases of scientific knowledge. Specifics of scientific knowledge. Conceptual foundations of scientific knowledge. Content and structure of the research process. The problem of truth. The main stages and forms of the research process.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Management of enterprise competitiveness.** Competition in a market economy. Competitive environment of the enterprise. The essence of the competitiveness of goods and services in the market. Factors of enterprise competitiveness. The main strategies of enterprise competitiveness. Enterprise competitiveness management system. Regulation of competition at the national and international levels. Competitiveness in the context of globalization.

**Contract law.** The concept and general characteristics of contract law in Ukraine. General provisions on contracts in the field of entrepreneurial activity. Fulfillment of contractual obligations by business entities (entrepreneurs). Agreements on the transfer of ownership. Agreements on the transfer of property for use. Contracts for the performance of works. Contracts for the provision of legal and factual services.

**Modern management concepts.** The essence and meaning of management concepts. Process management concept. Goals management concept. Controlling

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concept. The concept of project-oriented team management. Business process reengineering concept. Knowledge concept. Approaches to the formation of a knowledge management system. Knowledge strategy of the organization. Logistics concept. Modern resource concept in management. Quality management concept. Financial management concept. Kaizen management concept. The concept of total control. Benchmarking concept. The concept of Lean technologies. System "5S". Value Stream Mapping. Just-in-Time system. Kanban system. Time management concept. Flexible management concept. Risk management concept. Brand management concept. The concept of organizational design. The concept of organizational culture. Modern concepts of strategic management.

**Project management in the organization.** Project management system: goals, functions, structure elements. Organization of project management. External organizational structures of the project. Project content planning. Project structuring. Project planning in time. Project calendar planning. Project implementation control. Project content management. Creating a hierarchical structure of works. Distribution of work between participants and conclusion of contracts. Basic time management processes. Methods of reducing project implementation time. Defining operations to reduce their execution time. Deviation management. Project cost, resource, and contract management. Personnel and project quality management. Project risk management. The essence and classification of project risks. Integration and automation of project management.

**Quality Management.** Product quality as an object of management. Economic aspects of product quality. Factors affecting product quality. Legal aspects of quality assurance. History of quality management. International and regional cooperation of Ukraine in the field of quality management. Creation and implementation of a quality management system in the enterprise. Quality management based on the concept of TQM, stages of its development. Standards as a regulatory framework for quality management. Certification in the quality assurance system. Product quality planning and assessment. System of product quality indicators. Economic efficiency of quality management. Foreign experience in product quality management

### **Optional components of EPP**

#### ***Free choice according to specialty***

#### *Optional block 1 "Management in various organizational and legal forms of business"*

**Anti-crisis management of enterprises.** General concepts of the crisis and crisis phenomena. Classification of crises. The cyclical nature of crisis phenomena. Crisis recognition methodology. The purpose and objectives of anti-crisis management. The stability of the enterprise and the crisis. Transitional periods of enterprise development. Crisis as a turning point in development. A system of monitoring and early detection of signs of an impending crisis. Anti-crisis management problems and differentiation of management technologies. Functional and anti-crisis management. Crisis management scheme. The role of innovation in crisis management. The situational approach to management in a crisis. Organization of work to overcome the crisis.

**Risk-Management and Economic Security.** Risk in management and the basic principles of its analysis and management. Qualitative and quantitative risk analysis. System of quantitative assessments of the degree of risk. Risk and usefulness. Diversification as a way to reduce risk. Portfolio theory. Using game theory and statistical solutions to model risk. Making multi-purpose decisions in risk conditions. Cost, time, and risk. Risk and stochastic forecasting. Strategic (investment) management and risk. Economic security of the enterprise as a science, its subject, and method. The system of economic security of the enterprise. Assessment of economic security of the enterprise.

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**Supply chain management.** Theoretical foundations of supply chain management. The structure of the logistics supply chain. Choosing an alternative to improve the processes in the supply chain. Development of a multidimensional dynamic supply chain management model. Basic levels of decision-making in supply chain management, their classification, and relationship. Decision-making models in supply chain management. Decision-making in supply chain management in conditions of uncertainty. Operation of supply chains in conditions of risk. Business process management in supply chains. Development and implementation of logistics strategies in supply chains. Integration and cooperation in supply chains. Supply chain management information technology. Systems for measuring the economic efficiency of the supply chain. Value chain. Global supply chain management.

**Logistics management.** Logistics in the enterprise management system and current trends in logistics management. Theoretical foundations of logistics management: the essence of logistics management, stages of logistics management development. Logistics-oriented enterprise management system, logistics management tools. Logistics strategy of the enterprise and its components. The essence and main characteristics of logistics management organizing. Logistic management of procurement and production promotion processes. Logistics management of distribution processes and strategic partnerships in the supply chain. Strategic planning in the logistics management system. Strategic analysis of enterprise logistics. The efficiency of the logistics service of the enterprise.

**Digital Management.** The essence of the digital category and its features. Digital environment and how it works. Digital tools of manager. Effectiveness of digital management. Strategic management of development of Ukrainian agro-industrial enterprises on the principles of digitalization. Digital management of public resources. The process of combining digital transformation and the main strategy of the enterprise. Management of an agro-industrial enterprise with full digitalization of production.

**Complex quality management system of products and services.** Theory and methodology of quality management, principles of operation of quality management systems for different types of goods (products, services). Regulatory, organizational and economic issues of quality management of goods (services). Features of functioning of quality management systems of products, services and environment. The problem of quality at the present stage and its impact on the development of the country's economy; domestic and international experience in product quality management; the use of methodological bases of management: general approaches, principles and methods of work according to quality of goods.

**Corporate management.** The essence and economic nature of corporate management. Varieties of corporate associations as objects of corporate management. Joint-stock company as an object of corporate management. External environment of corporate management. Corporate capital management. Development of corporate management. Corporate control. Corporate culture.

**Management of cooperatives.** The essence of management activities in cooperatives. Administration in cooperatives and cooperative associations. Management communication skills: meetings, negotiations, conflict management. Ensuring transparent relations between managers and members of the cooperative. Management of planning processes in the cooperative, strategic planning. Improving processes and control in the cooperative. Leadership and team building. Management of financial activities in cooperatives.

**Change Management.** Study of theoretical approaches to change. Features of formation of organizations in the conditions of continuous changes. Forms and methods of changes in the organization. Features of changes in relation to individual functional blocks.

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Practical application of the theory and methodology of change in enterprises, overcoming resistance to change and structural change.

*Optional Block 2 "Energetic Management"*

**Energy and resource conservation in the energy sector.** The main directions of development of energy saving issues in Ukraine and in the world. Basic concepts and definitions. Energy and life. Energy and civilization. Energy as the main problem of our time. Energy consumption and its indicators as a criterion for the well-being of society. Energy and ecology. Energy conversion chain. Fuel and energy complex (FEC). The structure and development trends of the fuel and energy complex and energy consumption. Energy and the environment - a systematic approach. The complex impact of energy on the economy. Natural resources. Traditional energy. Alternative energy. Secondary energy resources. Energy consulting schemes. Conceptual provisions for the development of energy in Ukraine. Conceptual provisions and main directions of energy and resource conservation in Ukraine.

**Analysis and expertise of energy supply projects.** Prospects and main directions of energy management in Ukraine and in the world. The main problems and ways of developing energy management in modern energy. Formation of energy supply strategies. Power supply and load management. Normalization of energy consumption. Methods of determining the norms of unit costs. Economic efficiency of energy saving management at the enterprise. The essence of the project, its conceptual level and objectives. Fundamental solutions, feasibility study. Composition and content of the project and working documentation. Determination of the construction cost. Regulatory framework and procedure for determining the cost of construction on the territory of Ukraine. Expertise of the project.

**Basics of energetic audit.** The main normative documents governing the activities of auditors. The principles of energy auditing. Energy audit technologies. Audit requirements. Financial, energy and environmental audit. Audit task. Energy audit market participants. Typical objects of energy audit. Classification of types of energy audit. Previous energy audit. Targeted energy audit. Comprehensive energy audit. Energy service companies. Energy passport of the enterprise.

**Methods of energy efficiency analysis of energy consumption systems of production processes.** Indicators of the quality of electrical energy. Basic terms and definitions. State and international standards for the quality of electrical energy. Electrical energy certification. The influence of the quality of electricity on the work of consumers. Devices and means for measuring the quality indicators of electrical energy. Energy management and quality control of electrical energy. Technical and organizational measures to ensure the quality of electrical energy. Compensation of higher harmonics. Reactive energy compensation. Technical means of voltage stabilization. Specific consumption of energy resources. Methodological foundations for planning and forecasting the costs of energy resources. Strategic energy plan.

**Methods of energy efficiency analysis of buildings.** Regulatory documents in the field of certification of energy performance of buildings. Basic terms and definitions. Energy inspection of buildings. Instrumental support. Energy balance of buildings and systems. Heat transfer by transmission through the building area. Heat transfer by ventilation. Internal and solar heat gain. Shading elements. Dynamic parameters. Internal conditions. Quasi-constant heating and cooling. The energy requirements for heating and cooling the building. Energy consumption by heating, cooling, and ventilation systems. Regular heat loss in the system and auxiliary energy. Determination of the energy efficiency class of the building. Energy efficiency certificate. Report on the survey of engineering networks. Energy classification of buildings.

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**Combined power supply systems for local facilities.** Methods of structural-parametric synthesis of combined power supply systems with renewable sources. Modeling of micro energy systems taking into account their redundant structure and the set functional properties, character of power consumption, and regularities of reliability-cost characteristics for an increase of efficiency of power supply of local objects based on smart technologies. Indicators of coordination of deterministic choice of structural-parametric organizations of traditional and renewable energy sources. Features of stochastic functioning of renewable energy sources. The nature of electricity consumption and patterns of formation of the dynamic cost of electricity of micropower systems with heterogeneous sources. Substantiation of the principles of optimal power management of local facilities.

**Local equipment for data collection and processing in energy consumption systems.** Legislative and normative bases of metrology and metrological activity. Normative principles of electricity metering. Electricity meters and systems. Normative principles of heat energy accounting. General information about the "green tariff". Alternative and renewable energy sources. State regulation of electricity prices. Electricity supply to consumers. Basic requirements for the energy metering system. Primary sensors and technical means of information transmission.

**Energy management software and hardware complexes.** Basic principles of creating an automated energy accounting system. Main software products for LOSOD maintenance. "Energocenter" software environment. ADAX software environment. The software environment "NovaSys. Advanced Metering Infrastructure ". System configuration creation. Counter surveys. AWP power engineering. Formation of reporting channels. Creation, reservation and transfer of databases to third parties. Formation of reports. Creation of mnemonic diagrams for control rooms.

**The Internet of Things in Energy Consumption Systems.** Theoretical foundations for the formation of energy balances of local facilities and forecasting performance indicators in real-time. Discrete and combinatorial mathematical modeling of power supply systems with the differentiated cost of energy carriers. The principles of structuring, decomposition, pipelining in the substantiation of structures and model series (capacities) of energy sources. Methods for the synthesis of intelligent energy management systems.

The architecture of the Internet of Things. Hardware and software systems for the development of control systems based on the Internet of Things. Network components and technical platforms for managing the combined power supply of local facilities based on the Internet of Things.

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**Training of Masters**  
**in branch of knowledge 07 "Management and Administration"**  
**in specialty 073 "MANAGEMENT"**  
**educational program "MANAGEMENT OF FOREIGN ECONOMIC ACTIVITY"**

Form of training	Licensed number of students:
– full-time	75
– part-time	50
Duration of training	
– full-time educational and professional program	1 year and 4 months
– part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian, English
Qualification of graduates	Master of Management in Foreign Economic Activity

**The concept of training**

The main task of training masters in foreign economic activity management is to provide international and joint ventures and organizations in the field of agribusiness with specialists who could plan and forecast the activities of the subject of foreign economic activity (unit); forecasting the dynamics of demand for export-import products; development and substantiation of directions and means of expansion of markets of subjects of foreign economic activity; make effective management decisions in the implementation of foreign economic activity; to organize the foreign economic activity of the business entity in order to achieve its mission; manage the quality and competitiveness of domestic products on the world market; organization of commercial activity in international markets; currency and financial management of foreign economic activity; organization of advertising activity of the subject of foreign economic activity; formation of the company's image in the foreign market; monitoring the implementation of foreign economic transactions; carrying out activities related to customs management, interaction with customs authorities; registration of customs documentation and customs control. Graduates of the educational program are capable of creative professional activity and innovative approaches to foreign economic activity in conditions of global competition. The acquired knowledge combines a full-fledged fundamental economic education with practical skills of managerial decision-making, teamwork, negotiation and ensuring the effective operation of professional activities in the field of foreign economic activity management.

**Educational and professional program of master's training**

The educational and professional program "Management of foreign economic activity" provides a combination of the study of business disciplines and disciplines that allow to use the advantages of the world market in their activity; organize and carry out foreign economic transactions, evaluate their economic efficiency; develop and support foreign trade contracts, negotiate with representatives of foreign companies; to manage foreign economic activity, using the basic forms and methods of foreign economic activity, guided by the principles of organization of foreign economic activity.

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### **Areas of employment of graduates**

The graduate is suitable for employment in accordance with the National Classification of Occupations (DK 003: 2010):

- 121 - directors of enterprises, institutions and organizations;
- 1238 - project and program directors;
- 14 - managers (administrators) of enterprises, institutions, organizations and their departments;
- 141 - managers (administrators) in agriculture, hunting, forestry, fisheries and water sector;
- 1452 - managers (administrators) in wholesale trade and intermediary in trade;
- 1475.4 - managers (administrators) for commercial activity and management.

### **Practical training**

Future masters in management of foreign economic activity acquire skills of work with modern methods of management, proceeding from the tasks set before participants in foreign economic relations in the field of planning and organizing the export-import operations, international trade, including joint ventures and international corporations. Considerable attention is also paid to the peculiarities of the work of domestic enterprises and organizations that have access to the world market. Taking into account the peculiarities of foreign economic relations with partner companies, students learn to use the knowledge gained in the learning process in the event of any situations in the implementation of foreign economic activity.

### **Proposed Topics of Master's qualification Thesis**

1. Trade and economic cooperation of Ukraine with EU member states.
  2. Foreign economic security of the state in the conditions of European integration of Ukraine.
  3. Organizational and economic mechanism of creation and functioning of joint ventures in Ukraine.
  4. International leasing in the conditions of market transformation of Ukraine.
  5. Marketing strategies of European companies and experience of their implementation in Ukraine.
  6. Enterprise risk management when entering foreign markets.
  7. World trade in agricultural products and prospects for Ukrainian exports.
  8. Export potential of the grain industry of Ukraine.
  9. Ukraine's foreign trade in agri-food products.
  10. Forming the competitive advantages of the native agri-food products in world markets
  11. Organization of customs logistics of the enterprise-participant of FEA
  12. Management of the international competitiveness of enterprise.
  13. Estimation of opportunities and threats for the native enterprises under conditions of European Green Deal implementation.
  14. Forming the export strategy of enterprise to ensure the climate neutrality
  15. Economic consequences for the native enterprises from Ukraine's integration into the EU.
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**Master's curriculum  
under the educational program "Management of foreign economic activity"  
(educational and professional training program)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Organizational behavior and leadership	4	exam
CC 2	Business communications	4	exam
CC 3	Methodology and organization of scientific research with the basics of intellectual property	4	exam
<b>Total</b>		<b>12</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to the preferences of students from the list of disciplines</b></i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Management of foreign economic activity	10	Exam, project protection with evaluation
CC 5	Business design in an international environment	4	exam
CC 6	Cross-cultural management	4	exam
CC 7	International credit and settlement and currency transactions	4	exam
CC 8	Critical thinking and risk management in foreign economic activity	4	exam
CC 9	Management of international competitiveness of enterprises in the agri-food sector	4	exam
CC 10	Control and evaluation of the results of foreign economic activity of the enterprise	4	exam
CC 11	World agricultural markets	5	exam, project protection with evaluation
CC 12	Practical training	6	protection of the evaluation report
CC 13	Preparation and defense of master's qualification thesis	8	protection of the evaluation report
<b>Total</b>		<b>53</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to specialty</b></i>			
OC 1	Management of international commercial activity	5	exam
OC 2	International commercial law	5	exam
OC 3	TNCs in a global environment	4	exam
OC 4	Logistics in foreign economic activity	4	exam
OC 5	International agribusiness	4	exam
OC 6	International standardization and certification	4	exam
OC 7	Business strategies in marketing activities	4	exam
OC 8	Supply chain management	4	exam
<b>Total</b>		<b>17</b>	
<b>The total amount of compulsory components</b>		<b>65</b>	
<b>The total amount of optional components</b>		<b>25</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

## **Annotations of subjects in the curriculum**

### **GENERAL TRAINING CYCLE Compulsory components of EPP**

**Organizational behavior and leadership.** The purpose of teaching the discipline is to study the individual psychological characteristics of the individual, his motivation and attitude to various components of the labor process, vertical and horizontal communications and interpersonal relationships, trends in organizational development and reactions to change, which will identify, understand and predict human behavior in specific situations. The main tasks of teaching the discipline are: to acquaint future managers with the terminology, the conceptual apparatus of the discipline "Organizational Behavior" and to ensure its assimilation by students; to equip students with a system of knowledge in the field of theoretical, methodical, information bases of the discipline; to teach future managers to form a system of adaptation and development of personnel in the organization; teams and team interaction; learn to develop a reward system in the organization; personnel evaluation system of the organization; a system of values that support the mission of the organization and motivate employees to achieve it; to ensure students' interest in active teaching and research work.

**Business communications.** The purpose of the discipline is to form a system of communication skills in the field of international business for higher education students, in particular, to take into account the specific features of a multicultural business environment. The application of theoretical knowledge in the preparation, organization, and conduct of business meetings and negotiations to improve the effectiveness of private international cooperation to gain practical skills in business communication with foreign partners; the application of knowledge of relevant software; and the simplification of business procedures in the international partnership are tasks in the study of the discipline.

**Methodology and organization of scientific research with the basics of intellectual property.** The purpose of studying the discipline is to ensure the quality of the master's thesis. The teaching of the discipline is based on mastering the theoretical foundations and methodology of scientific research on the problems of foreign economic activity of agro-industrial enterprises. The objectives of the discipline are: to acquaint students with the relevant concepts, categories, methods of organization of research and protection of intellectual property in research; acquisition of practical skills in the organization and conduct of scientific research and presentation of research results in the form of publications and qualification work, the formation of the ability to creatively search for directions and reserves to improve foreign economic activity of agro-industrial enterprise.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP**

**Management of foreign economic activity.** Module 1. FEA Management. The subject of the course "Management of Foreign Economic Activity" is a complex set of management relations arising in the field of foreign economic activity in connection with planning, organization, management and control of specific international business operations at various levels of business management, mainly enterprises. It also includes management activities not only of Ukrainian enterprises in foreign markets, but also of foreign firms in Ukraine, various activities at the level of enterprises, regions, ministries and departments. Module 2. State regulation of foreign economic activity. The main purpose of the discipline "State regulation of foreign economic activity" is to study modern methods and tools for regulating foreign economic activity, factors influencing the choice of regulatory policy in foreign trade, foreign investment and monetary finance of the

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economy, areas of effective system of state regulation of foreign economic activity. The main objectives of the discipline are: to acquaint students with the relevant concepts, categories, methods and tools for regulating foreign economic activity; acquisition of practical skills in choosing regulatory policy in foreign trade, foreign investment and monetary and financial spheres of the country's economy; education of the ability to creatively search for directions and reserves for improving foreign economic activity.

**Business design in an international environment.** The modern methodology of business design is considered, the main stages, approaches and basic tools, the methodology of business design are determined, the efficiency of the logical-structural approach used by international organizations in the development of development and restructuring projects is determined. The main purpose of the course is to provide students with an idea of the methodology of preparation and implementation, methods and means of attracting resources for the implementation of international projects and mechanisms for their management.

**Cross-cultural management.** The course "Cross-Cultural Management" examines the management of relations arising on the border of national and organizational cultures, explores the causes of intercultural conflicts and their neutralization, clarification and use in managing the organization of patterns of behavior inherent in the national business culture. The purpose of the discipline is to form a cross-cultural approach to doing business in today's globalization in order to improve the efficiency of management and the application of knowledge in practice.

**International credit and settlement and currency transactions.** The purpose of the discipline is to form students' conscious involvement in deepening Ukraine's integration into the world community through the ability to carry out credit and settlement and currency transactions. The task of studying the course is for students to acquire theoretical knowledge and acquire practical skills in performing credit and settlement and currency transactions carried out in the service of foreign economic activity of exporters and importers. The main attention is paid to the essence, motivation and forms of international settlement, credit and currency operations. The evolution of the world monetary system, the specifics of development and functioning at the present stage of the international currency exchange market, the directions of international business development are shown.

**Critical thinking and risk management in foreign economic activity.** In the conditions of fast dynamics of market processes the integral part of effective management becomes risk management of the enterprise. It is especially important when working in foreign markets, where the rules of operation differ significantly from those within the country. Hence, effective risk management of foreign economic activity is not only an important prerequisite for the survival of enterprises in modern conditions, but also the key to successful commercial activity in foreign markets.

**Management of international competitiveness of enterprises in the agri-food sector.** The purpose of studying the discipline is to provide students with knowledge about the objective laws, real processes and specific features of the international competitiveness of the enterprise, in terms of foreign economic activity, the acquisition of skills for their practical application. The objectives of the course are: students' understanding of the essence and features of international competitiveness, study of the theoretical foundations of international competitiveness, acquaintance with the main forms of international trade and investment cooperation; understanding of features, mechanisms, principles and tasks of ensuring international competitiveness; acquainting students with the features and nature of modern competition in world agricultural markets, integration processes, Ukraine's place in them.

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**Control and evaluation of the results of foreign economic activity of the enterprise.** The purpose of studying the discipline is to master the knowledge of a balanced system of indicators that are used to determine the effectiveness of management of foreign economic activity of the enterprise. The substantiation of the importance of economic and financial indicators in the management of foreign economic activity, key aspects of the company's financial statements, balance sheet, profit and loss statements, cash flows, liquidity and financial stability of enterprises, company valuation, financial levers, valuation system product portfolio of the enterprise; the ratio of costs, sales and profits; efficiency of foreign trade operations. The strategic approach to construction of the balanced system of indicators of the enterprise adapted to its needs, a stage of a life cycle and specificity of foreign economic activity is considered. To establish effective control over the foreign economic activity of the enterprise, various methods of planning and control of activity are studied, in particular the SMART method.

**World agricultural markets.** The purpose of the discipline is to acquire and develop students' theoretical knowledge and practical skills of market analysis, issues of interest to individual producers of agri-food products, managers of agricultural enterprises and analysts to assess the consequences of certain management decisions in agriculture. Study of the world agricultural market as a system of exchange of agri-food products. Functional and organizational features of world agricultural markets. History of origin, evolution and main tendencies of modern development of world agricultural markets, place of Ukraine on them. Characteristics of world markets for agricultural products; formation of global demand and supply of agri-food products. Subjects and objects of world agricultural markets, principles and patterns of pricing in world agricultural markets.

#### **Optional components of EPP**

##### ***Free choice according to specialty***

**Management of international commercial activity.** The nature of international market relations implies flexibility of entrepreneurial behavior and rapid response to ever-changing external conditions by participants in international trade. Therefore, in their arsenal should be knowledge of the many options for conducting commercial transactions. Commercial activity in international markets has several features: a specific external environment in which participants have to act in trade agreements, fluctuations in the market price of national currencies, the application of international law, participation in agreements of counterparties from different countries. All this multiplies the risks of international commercial entrepreneurship.

**International commercial law.** The aim of the course is an in-depth study by students of the basic concepts, principles, and norms of international commercial law. Particular attention is paid to acquainting students with the principles and norms of law of the World Trade Organization. The main objectives of the course are to deepen students' knowledge of the principles and rules of law of the World Trade Organization, institutional mechanisms for regulating modern international economic relations, modern standards and prospects for international investment.

**TNCs in a global environment.** One of the main trends in globalization is transnationalization, when a significant part of production, consumption, exports, imports, and income of the country depends largely on the activities of TNCs located outside a country. TNCs are both the result and the main participants in globalization. Transnationalization is a new stage, which is a process of strengthening global integration as a result of global operations of TNCs. Transnational corporations provide economic, financial, trade, technological and political-social interaction between countries. The activities of transnational corporations are changing the economic policies of the world community.

**Logistics in foreign economic activity.** The purpose of the discipline is the formation of systematic theoretical knowledge and the acquisition of practical skills of

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students in the organization of logistics in foreign economic activity. The main objectives of the discipline - to show future professionals that the rational organization of international transport provides intensive use of rolling stock, timely delivery of goods from country to country, optimizes transport costs for exports and imports of goods; study by students of international legal agreements, acts of bilateral agreements and norms of domestic legislation that establish the procedure for regulating transport activities for international transportation; acquaintance of students with the list and forms of transport document circulation on foreign economic operations; analysis and substantiation of competencies of state bodies for licensing and certification.

**International agribusiness.** The purpose of the discipline is to form systematic knowledge of the basics of the international agri-food system, identify major trends in the world food market and Ukraine's place in it, experience in international agribusiness in some regions of the world and in countries with different levels of development. In the process of studying the discipline, the regional structure of international agribusiness is analyzed; features of its development in the most developed countries of the world, in the countries of Eastern Europe and the CIS, and also in the developing countries are defined.

**International standardization and certification.** The purpose of the discipline is to form specialists with knowledge of the full process of crop production in the field of standardization with international, regional and progressive national systems of standardization of foreign countries to improve the quality of domestic products and their competitiveness in the world market. Objectives of the discipline: convergence and harmonization of the state standardization system of Ukraine with interstate and regional systems, progressive national standardization systems of other countries, improvement, and development of the fund of scientific achievements of Ukraine on standardization on the basis of international, regional and national standards of other countries. generalization and maximum use of scientific and technological progress; conducting a purposeful scientific, technical and economic policy by developing international and regional standards based on the standards of Ukraine for new competitive products and services; improving the regulatory framework for trade, economic and scientific and technical cooperation with other countries and participation in the international division of labor; ensuring the protection of the country's interests during the development of international, regional and interstate standards; ensuring the unity of measurements; ensuring mutual recognition of test results and product certification.

**Business strategies in marketing activities.** The main purpose of the course is to form in students a system of theoretical knowledge and applied skills for the modern methodological apparatus of solving problems of business internationalization, work in international markets and management in international companies. The discipline studies the systems of organization of international activities of firms, their strategies in an internationally competitive environment, specific examples of the organization of international business in multinational companies, as well as mechanisms of control, coordination, protection against risks in international business.

**Supply chain management.** Theoretical fundamentals of business processes in supply chains. Role and importance of supply chain management in the international business practice. Design, classification, supply chain parameters and methods of their improvement. Management of organizational changes in supply chains. Conception of supply chain management. Decision making in supply chain management under conditions of uncertainty. Logistic strategy and its role to ensure the efficiency and effectiveness of a supply chain. Integration and cooperation in supply chains. Information technologies of supply chain management. Supply chains in the Internet environment. Economic aspects of supply chain management. Systems for measuring the economic efficiency of a supply chain. Global supply chain management. The tendencies in a supply chain globalisation. Supply chains as a logistical form of the organization of interfirm interaction.

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty "MANAGEMENT"  
educational program "ADMINISTRATIVE MANAGEMENT"**

Form of training	Licensed number of students:
– full-time	85
– part-time	50
Duration of training	
– full-time educational and professional program	1 year and 4 months
– part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian, English, German
Qualification of graduates	Master of Management, manager (administrator) in administrative management

**The concept of training**

The educational program is focused on training highly professional managers capable of managing agribusiness based on the possession of deep professional knowledge and skills, modern computer technology, innovative knowledge and foreign languages. Specialists have the right to hold senior positions in enterprises and organizations of agro-industrial production, as well as in central and local government.

The Administrative Management educational program is the highest level of business qualification of a manager and the most prestigious business education program in the world. The specialty involves the training of senior management of the new generation, competitive in the labor market, capable of creative professional activity and innovative management methods in conditions of global competition; providing students with integrated system knowledge that combines a full-fledged basic economic education with practical skills in management decision-making, teamwork, negotiation and presentations for professional business management.

The program provides a prerequisite for industrial and undergraduate practice in enterprises of various sectors of the economy and spheres of activity, in agricultural companies, farms, investment companies and investment divisions of large enterprises, in international companies.

**Educational and professional program of master's training**

**Optional subjects of EPP**

***with the possibility of creating an individual educational path in the framework  
of the project "Agrokebety"***

The educational program is focused on training highly professional managers capable of managing agribusiness on the basis of deep professional knowledge and skills in management, agronomy, agricultural engineering, and animal husbandry. Graduates have innovative knowledge in agricultural production.

The Project providing training of specialists to manage the process of efficient production in agricultural companies by introducing intensive production technologies, reducing costs, increasing the economic efficiency of production and intensifying international cooperation in technology exchange and organization of teamwork. In terms of the project are prepared top managers and systems analysts capable of making

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strategic decisions in terms of risk, continuous development and improvement of entrepreneurial activity in a competitive environment of the agricultural sector.

***with the possibility of creating an individual educational path with the possibility of obtaining double diplomas “IMA-Agrarian Management”***

The Program providing training of specialists to manage the process of efficient production in agricultural companies through the introduction of intensive production technologies, cost reduction, the latest economic efficiency of production and intensification of international cooperation in technology exchange and teamwork. We are training top managers and systems analysts capable of making strategic decisions in terms of risk, continuous development and improvement of entrepreneurial activity in a competitive environment of the agricultural sector. The program has international accreditation ACQUIN. Studying for the 1st and 2nd semesters of the first year of study are semesters of international mobility.

***with the possibility of creating an individual educational path “Management of health care facilities”***

In terms of the Program there is training for professionals to manage healthcare facilities through the introduction of innovative management technologies, cost reduction, cost-effectiveness and teamwork. We are training on senior managers and systems analysts capable of making strategic decisions in conditions of risk, continuous development and improvement of activities in a competitive healthcare environment.

**Areas of employment of graduates**

Management of enterprises and structural subdivisions of enterprises of agrarian and related spheres of economy, including with foreign investments.

Management of health care facilities and their structural subdivisions.

**Practical training**

Future master's graduates at specific enterprises acquire knowledge on technological issues of the enterprise and acquire skills of selection and successful use of methodological tools for assessing the market environment and developing options for strategic behavior of enterprises. Taking into account the industry specifics of master's programs, students learn to apply the knowledge gained in the learning process in accordance with any situations that may arise in agricultural production. All production tasks are solved from the standpoint of technological, organizational and personnel support.

**Proposed Topics of master's qualification thesis**

1. Operational management and ways to improve production and logistics processes of the enterprise.
  2. Innovative strategy for growing crops indoors.
  3. Product quality management as a factor in improving the efficiency of the enterprise.
  4. Organization of the enterprise management system and measures to increase its efficiency.
  5. Rationale management decisions in the management of soil fertility zones.
  6. Introduction of resource-saving technologies in the enterprise.
  7. Substantiation of expediency of introduction of innovative technologies in crop production.
  8. Outsourcing of human resources in the enterprise management system.
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9. Social aspects of management in agricultural enterprises.
10. Management of crop production at the enterprise.
11. Psychology of management in the field of health care.
12. World experience in the organization and management of the health care system and the ability to adapt it to the conditions of Ukraine.
13. Areas of reform and the concept of health care development in Ukraine.
14. Priority areas of management of training of heads of health care institutions.
15. Health insurance as a component of compulsory social insurance in Ukraine.

**Curriculum of Master training  
in educational program "Administrative Management"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Personal productivity and communication efficiency	4	exam
CC 2	Team building and HR management	4	exam
CC 3	Research methodology with the basics of intellectual property	4	exam
<b>Total</b>		<b>12</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Business management	6	exam
CC 5	Monitoring and evaluation of performance	5	exam
CC 6	Business modeling and project management	4	exam
CC 7	Design and management of business processes	4	exam
CC 8	Modern approaches and management tools	4	exam
CC 9	Organizational behavior and leadership	4	exam
CC 10	Production Practice	5	defense report with grade
CC 11	Preparation and defense of master's qualification thesis	5	defense thesis with grade
<b>Total</b>		<b>37</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>with the possibility of creating an individual educational path in the framework of the project "Agrokebety" OR double diplomas "IMA-Agrarian Management" OR "Management of health care facilities"</i>			
OC 1	Systems of modern technologies	13	exam
OC 2	Smart technologies in agromanagement	4	exam
OC 3	Business planning	4	exam
OC 4	Business strategies and marketing decisions	4	exam
OC 5	Land and legal relations in agribusiness	4	exam
OC 6	Ethics of business communication and rhetoric	4	exam
OC 7	Agrarian policy	5	exam
OC 8	Strategies of international agricultural marketing	4	exam
OC 9	Methodology of empirical and social research and economic informatics	5	exam
OC 10	Economics of production	5	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 11	Management consulting	5	exam
OC 12	Enterprise planning and organization	5	exam
OC 13	Cross-cultural management	4	exam
OC 14	Management of medical institutions	5	exam
OC 15	Management psychology and conflictology	5	exam
OC 16	Medical insurance	5	exam
OC 17	Anti-crisis management of health care facilities	6	exam
OC 18	Strategic management	6	exam
OC 19	Quality management of medical services	6	exam
<b>Total</b>		<b>33</b>	
<b>The total amount of compulsory components</b>			<b>49</b>
<b>The total amount of optional components</b>			<b>41</b>
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Personal productivity and communication efficiency** The task of the subject is to ensure the development of effective systemic thinking of the leader in order to increase his own effectiveness and efficiency, to learn how to manage his life and time, as well as the time of subordinate employees, will ensure an increase in the efficiency of both his own work and the work of the entire team. The subject providing acquisition of theoretical knowledge and practical skills for effective personal development of a manager; formation and behavioral skills necessary for the future leader; development of skills to organize personal work and work of subordinates. The main tasks of studying this subject are theoretical and practical training for acquiring the competencies of managing personal self-development; developing skills in using time as a resource.

**Team building and personnel management.** *Module 1. Team building and conflict resolution.* The purpose of the presentation of the discipline is to study the features of group dynamics; differences between the team and the team, the definition of the main characteristics of the team, the main types of groups depending on the level of development of group activity, the basic principles of the team's work; description of the stages of team formation and development; building team interaction, distribution of roles in the team, application of team building techniques; determination of the means of forming a cohesive team; assimilation of the methodology for conducting teambuilding trainings; identify team development problems.

*Module 2. Personnel management.* Personnel management in the management system of organizations. Human resource management is a social system. HR policy and HR strategy. Personnel planning in organizations. Organization of recruitment and selection of personnel. Organization of activities and functions of personnel management services. Formation of the team of the organization. Cohesion and social development of the team. Assessment of personnel in the organization. Managing the development and movement of the organization's personnel. Personnel release process management. Social partnership in the organization. Efficiency of personnel management.

**Research methodology with the basics of intellectual property.** The main stages in the development of Ukrainian science and higher education, their current state, features of the stepwise reform of higher education with an orientation towards the preparation of masters, candidates and doctors of science. Scientific research methods

(historical, biological, zootechnical, veterinary, special) and the formation of scientific research tasks, invention and patent science.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of EPP**

**Business management.** *Module 1. Business management: the basics.* The main goal of studying this academic discipline is the formation of students' analytical creative thinking by mastering the theoretical foundations of the analysis of activities and the acquisition of skills necessary in practical work, control in all areas of the enterprise as a tool to improve the efficiency of management activities. In the process of studying the discipline, students must learn to understand the essence of economic phenomena and processes, their interconnections and interdependence, the ability to detail them, systematize and model, determine the influence of factors, evaluate the results achieved, and identify reserves for increasing the efficiency of the enterprise. Conflict identification, conflict management.

*Module 2. Business management: business game.* Fundamental management concepts. Operating expenses of fixed assets. Classification of costs and outputs in agricultural enterprises. Foundations of production theory. Multi-period calculations of investment efficiency. Agricultural management. Fundamentals of business planning using AI software planning.

*Module 3. Critical thinking and management decision making.* The main tasks in teaching the discipline are the definition of organizational and personal goals, the decomposition of goals, the whole structure. The discipline involves the presentation of the foundations of the theory and practice of making managerial decisions: organizational, economic, mathematical, psychological and heuristic aspects of the process of making managerial decisions; target orientation of management decisions, reduction of uncertainty and risk in decision-making at all management levels.

**Monitoring and evaluation of performance.** *Module 1. Analysis and control of the enterprise.* The main goal of studying this academic discipline is the formation of students' analytical creative thinking by mastering the theoretical foundations of the analysis of activities and the acquisition of skills necessary in practical work, control in all areas of the enterprise as a tool to improve the efficiency of management activities. In the process of studying the discipline, students must learn to understand the essence of economic phenomena and processes, their interconnections and interdependence, the ability to detail them, systematize and model, determine the influence of factors, evaluate the results achieved, and identify reserves for increasing the efficiency of the enterprise.

*Module 2. Key management indicators.* Studying a set of coefficients - key management indicators that allow for a comprehensive analysis of the company and propose informed management decisions for improvement through the criteria of profitability, value, cash flows, and possible risk. Determination of the scale of assessment and determination of the rating of the company

**Business modeling and project management.** General characteristics of project management. Project management system. Functions, principles, methods of business modeling. Design functions, design principles, organizational foundations for building projects and identifying changes. The environment of projects and modern models of design solutions. Control over the implementation of the project. Project quality and cost management. Informational communication in the project. Formation and development of a project team.

**Design and management of business processes.** The objectives of the discipline are to acquire management knowledge from the standpoint of process approach, the principles of distribution of business processes in the organization, the use of

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methodological and methodological issues of process-oriented enterprise management in the application of process approach, building models of end-to-end business processes. The purpose of studying the discipline is to form a system of theoretical knowledge and applied skills and abilities to use the principles, methods and tools of business process management.

**Modern approaches and management tools.** The essence and development of the theory of strategic management. Strategic management process: essence and components. The environment of the organization and its strategic analysis. Formation of the strategic goals of the enterprise. Enterprise strategy system. Portfolio analysis methods and tools. Decision making theory. Models for solving problems of break-even activity. Transport tasks and logistics. Optimal investment portfolio formation model. Quantitative Methods in Strategic Management.

**Organizational behavior and leadership.** The purpose of the discipline is to form students' knowledge of behavioral economics, involves learning to act rationally, with maximum benefit for themselves. determination of the role of emotions in the acquisition of goods, mistakes in the acquisition of goods, risk appetite and effective protection of funds, weighted investment, efficient market hypothesis, framing, prejudice and self-control in the implementation of consumer behavior. The study of the discipline allows you to understand the laws of nature and be guided by the granted eternal values, develop a culture of mutual trust and respect, ensure a well-coordinated team, understanding the differences in the behavior of subordinates, the concept of creative space for other people, effective delegation of authority, leadership development programs.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Systems of modern technologies.** *Module 1. Agronomy (technology systems).* The purpose of studying the discipline is to form in modern managers practical and scientific ideas about advanced systems in relation to modern intensive technologies in agronomy on the basis of the latest developments in science and technology. As a result of studying the discipline, students will be able to: compare the features of growing crops with different growing technologies; to plan material and technical support of the economy; select varieties and hybrids for the zone; calculate the norms of pesticides in the transition to a new technology and system for reducing the pesticide load; if necessary, carry out statistical processing of results.

*Module 2. Agricultural engineering (technology systems).* The purpose of the discipline - the formation of higher education students a set of knowledge, skills and abilities for implementation in production activities using mechanized production technologies, primary processing, storage and transportation of agricultural products, use, maintenance and repair of agricultural machinery, organization and management of structural units

*Module 3. Livestock (technology systems).* The composition of productive livestock: meat and dairy cattle breeding (milk production, beef production), pig breeding, poultry, sheep, horse breeding, beekeeping, pond fish farming, silkworm breeding, etc. In the process of studying the discipline, students acquire knowledge of the technology of milk and beef production; technologies of pig production, technologies of poultry production, technology of sheep production. Acquisition of knowledge on breeding and feeding of farm animals, their maintenance, animal hygiene.

**Smart technologies in agromanagement.** The purpose of the discipline is to consider the main problems and prospects for the use of the latest progressive technologies in agriculture in Ukraine. Study of individual technologies of UAVs in agro, precision farming systems, satellite monitoring, meteorological, ground scanners, their

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logic, value, etc. Ensure the study of each operation in agricultural production (tillage, fertilization, sowing, plant protection products, harvesting) with the logic of the correct and most effective application of the necessary AgTech technologies.

**Business planning.** Enterprise planning: general economic principles, key indicators and methods for determining the optimal organization and planning of the enterprise; drawing up a description of the enterprise; definition and comparison of production processes; a combination of production processes, calculation of the main production and economic indicators; the concept of fact-enterprise and optimized enterprise; drawing up plans for the development of the enterprise; analysis of indicators of profitability, stability and liquidity; differentiation of static and multi-period methods of planning economic activities; drawing up an estimate of the enterprise; program planning; elements of linear programming; basic concepts of investment and financing; forms of financing; credit, liquidity and financial planning; software for planning processes (familiarization with the work of MAX, BEP programs) elements of linear programming: calculation of the optimal feed ration, production model, investment and financing.

**Business strategies and marketing decisions.** The task of the discipline is to provide students with a holistic and logical system of theoretical knowledge and practical skills in the main areas of marketing activities: research, comprehensive analysis and market forecasting, development of a marketing strategy and tools for its implementation (product and price policy, distribution policy, communication policy, control of marketing activities). Particular attention is paid to the definition of business strategies based on marketing research: strategic planning, marketing research, analysis of consumer markets, customer behavior, market segmentation. Determination of assortment, price, sales policies, basic strategies of integrated marketing communication.

**Land and legal relations in agribusiness.** The main provisions of the land reform in Ukraine. The current state of the mechanism of administrative and legal regulation of relations in the agrarian sphere. Types and procedures of legal liability. State registration and state regulation of organizations, enterprises, institutions.

**Ethics of business communication and rhetoric.** Study of ethical norms and ritual rules of business relationships, the acquisition of knowledge and skills related to the exchange of information, the use of methods and means of mutual influence, mutual understanding. Moral norms of business communication. Study of the rules and norms of behavior of partners that contribute to the development of cooperation. Code of honor for employees. Tools and methods of professional communication, professional culture of communication, communication norms, documents' flow in an organization, types of documents.

**Agrarian policy.** The reasons for state regulation of agricultural production, the essence and goals of the state's agrarian policy. Economic consequences of the use of certain instruments for regulating the domestic agricultural sector. Measures to regulate the domestic agri-food market. Measures for regulating foreign trade in agri-food products. Basic approaches to assessing the level of state support for the agricultural sector and Regulation of the global agri-food system within the WTO. Evolution of state support for the agrarian sector and the main directions of modern agrarian policy in Ukraine. Features of the agrarian reform in Ukraine and the main factors that follow from it. Tax regulation in agriculture. Regulation of the main agricultural markets in Ukraine.

**Strategies of international agricultural marketing.** Management of the marketing activities of the enterprise. Marketing environment and information system. Segmentation of the agricultural market. Marketing pricing and product policy. Marketing communications policy.

**Methodology of empirical and social research and economic informatics.** Theoretical foundations and hardware of modern information systems. Data management.

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Economic information processing software. Organization of effective Internet search. Application software for processing economic data. The essence, types and process of scientific research. Fundamentals of Research Methodology. Empirical and special methods. The structure of social empirical research. Information support of social empirical research. Design and forms of implementation of the results of social empirical research.

**Economics of production.** Methods for assessing the economic efficiency of production. Production of marketable crop products. Feed production processes. Dairy farming. Keeping and fattening cattle. Breeding pig breeding. Fattening pigs. Determining the need for working capital. Simplified planning of economic activity of the enterprise with the help of program planning I and II.

**Management consulting.** Development of the institute of counseling. Methods of consulting activities. Marketing consulting services. Management consulting technologies.

**Enterprise planning and organization.** Enterprise planning: general economic principles, key indicators and methods for determining the optimal organization and planning of the enterprise; drawing up a description of the enterprise; definition and comparison of production processes; a combination of production processes, calculation of the main production and economic indicators; the concept of fact-enterprise and optimized enterprise; drawing up plans for the development of the enterprise; analysis of indicators of profitability, stability and liquidity; differentiation of static and multi-period methods of planning economic activities; drawing up an estimate of the enterprise; program planning; elements of linear programming; basic concepts of investment and financing; forms of financing; credit, liquidity and financial planning; software for planning processes (familiarization with the work of MAX, BEP programs) elements of linear programming: calculation of the optimal feed ration, production model, investment and financing.

**Cross-cultural management.** Cross-cultural management studies the behavior of people in organizations around the world and teaches them to work in companies where people and customers are from different cultures. The discipline provides knowledge on typical organizational behavior in different countries, summarizes, describes and compares their cultural characteristics of doing business in different countries, allows you to understand and improve interaction in an international team and improve relations between employees, customers, suppliers and partners. Cross-cultural management expands the possibilities of internal management in areas covering international and intercultural relations.

**Management of medical institutions.** Approaches to the management and organization of the provision of medical services to the population, especially the functioning of medical institutions. Study of the basic and specific functions of management. Principles, methods and objectives of management. Management decision making process.

**Management psychology and conflictology.** The essence and content of the main categories of psychological science used in management, the psychological characteristics of the personality of a modern manager (temperament, stable and individual characteristics of mental processes, focus, etc.) and their impact on the effectiveness of management are considered. The problems of development and dynamics of the labor collective, the criteria for its stability, compatibility of group members and types of groups are deeply analyzed. The theory of intervention in conflict situations (General concept of a conflict situation and conflict. Model of the conflict process. Types and types of conflicts. Objective and subjective prerequisites and causes of conflict situations and conflicts. The main elements of the theory of intervention). The norm as a basis for assessing conflict behavior (Normative requirements for social forms of behavior. Altruism and egoism as social norms of behavior. Coercive norms of behavior in interpersonal relations). Power relationships in organizations. The nature of the conflict at

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the enterprise (The concept of the work collective and its functions. Classification of work collectives and their structure. Formal and informal groups. Characteristics of informal organizations and their management. Model of the conflict process. Consequences of the conflict).

**Medical insurance.** Health insurance services in Ukraine. Health insurance system. Voluntary health insurance, a contract for the provision of medical services, a contract between the insurance company and the organization of assistance.

**Anti-crisis management of health care facilities.** Methods and technologies of crisis management. Crisis, definition of crisis. Tasks and principles of crisis management. Tools for crisis management, determining the state of crisis and bringing the company out of crisis.

**Strategic management.** The essence and development of the theory of strategic management. The process of strategic management: essence and components. The environment of the organization and its strategic analysis. Formation of strategic goals of the enterprise. The system of enterprise strategies. Methods and tools of portfolio analysis. Decision theory.

**Quality management of medical services.** Legislative regulation of medical services. Quality of medical services. Quality management of medical services. Subjects and objects of control over the provision of medical services. External departmental control. Internal quality control of medical services. Public control over the provision of medical services. Performing control functions in health care facilities.

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**Training of masters of sciences  
in branch of knowledge “Management and administration”  
Specialty 073 “MANAGEMENT”  
Educational program “MANAGEMENT OF INVESTMENT ACTIVITY  
AND INTERNATIONAL PROJECTS”**

Form of Training:	Licensed number of persons:
– Full-time	50
– Part-time	25
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Full-time educational and research program	1 year and 10 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
– educational and research program	120
Language of Teaching	Ukrainian, English
Qualification	Master in Investment Management and Project Management

**The concept of training**

Training in the educational program is aimed at training specialists in the development of investment policy of companies and project management, search for international programs and grants and identifying sources of investment, due to the need for agro-industrial production in project managers, coordinators and project managers, investment managers and analysts, heads of investment departments and investment consultants. Mastering the writing of projects and obtaining a diploma in leading educational institutions of Poland and a diploma of NUBiP of Ukraine thanks to double diploma programs.

**Educational and professional program of master’s training**

***Optional block "Investment Management"***

The purpose of the program is to train investment management specialists who are able to skillfully develop and justify the concept of an investment project, evaluate its effectiveness taking into account risk factors and uncertainties, perform feasibility studies and develop a business plan for the project, evaluate and select the most effective investment tools, develop the estimate and budget of the project and ensure its implementation, form a project team, implement monitoring of the project implementation and change management.

**Areas of employment of graduates**

Graduates will be able to work as project managers, coordinators and managers of investment and business projects, investment managers, analysts and consultants, heads of investment departments at enterprises of various sectors of the economy and spheres of activity, in investment companies and investment departments of large enterprises.

**Practical training**

Future specialists in project management and programs in the field of tangible (intangible) production, using the example of developing real investment projects, study the peculiarities of investment management, acquire practical skills in drawing up a

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business plan for an investment project, analyzing the financial condition of business entities and determining investment directions, assessing the quantitative and qualitative characteristics of investment projects, management of investment portfolio optimization, assessment of investment attractiveness and selection of specific projects.

#### **Proposed Topics of master's qualification thesis**

1. Strategic analysis of factors influencing the investment of the agricultural sector.
2. The role of the state in stimulating the investment activity of processing enterprises.
3. Assessment of the investment attractiveness of the region (enterprise).
4. Organization of pre-investment research in the organic market.
5. Modeling of investment strategy of agricultural enterprise.
6. Development of strategic directions and forms of investment activity of the enterprise.
7. Planning of investment activity of the enterprise.
8. Management of the effectiveness of the investment activity of the corporation.
9. Formation of business strategy of the enterprise.
10. Management of the implementation of an investment project at the enterprise.

#### ***Optional block "Management of international projects"***

The aim of the program is to train international project management professionals who will have knowledge and practical skills in finding information about international programs and grants, preparing and submitting project applications and managing projects using international project standards. The program provides for the training of qualified personnel capable of creative professional activity and the introduction of innovative methods in the management of international projects.

#### **Areas of employment of graduates**

Graduates will be able to work as project managers, coordinators and managers of international investment and business projects, investment managers, analysts and consultants, heads of investment departments at domestic enterprises of various sectors of the economy and spheres of activity, in international companies.

#### **Practical training**

Future masters on the example of preparing real international projects study the basic requirements for their writing and implementation, master the directions of grant activity of international organizations and governments of countries. As potential managers, they learn how to manage international projects, acquiring knowledge of the practical aspects of finding sources of funding based on the analysis of international programs and grants, negotiating with potential partners in a complex investment environment.

#### **Proposed topics of master's qualification thesis**

1. International programs and grants as sources of project financing.
  2. Development of a business plan for an international project for an agricultural enterprise.
  3. Development of an investment project for an agricultural enterprise.
  4. Management of the cost of an investment project.
  5. Managing risks and changes in the project.
  6. Management of the implementation of the investment project of an agricultural enterprise.
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7. Development of a strategy for financing innovative projects.
8. Financial substantiation of programs at the stage of pre-project research.
9. Management of efficiency of investment projects of agricultural enterprises.
10. Risk management in investment projects of agricultural enterprises.

**Curriculum of Master training**  
**In educational program "Management of investment activity**  
**and international projects"**  
**(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Investment Management	4	Exam, Course project
CC 2	Macroeconomic analysis and investment strategy	4	Exam
CC 3	Project Management: Project risk management Creative Technologies in Start-Up Project Management	8	Exam
			Exam
CC 4	Methodology and organization of scientific research with the basics of intellectual property	4	Exam
CC 5	State mechanisms for managing investment programs and projects	4	Exam
<b>Total</b>		<b>24</b>	
<b>Optional components of EPP</b>			
<i><b>free choice according to the preferences of students from the list of disciplines</b></i>			
OCP 1	Optional discipline 1	4	Credit
OCP 2	Optional discipline 2	4	Credit
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE OF</b>			
<b>Compulsory components of EPP</b>			
CC 6	International programs and grants	4	Exam
CC 7	Project approach in business management	4	Exam
CC 8	Project finance	4	Exam
CC 9	Marketing strategy in project management	4	Exam
CC 10	Information technologies in project management: Scrum, agile, MS Project in Project Management Creative technologies in the social projects management	8	Exam
			Exam
CC 11	Practical training	8	Credit
CC 12	Preparation and defense of master's qualification thesis	10	master's thesis defense
<b>Total</b>		<b>42</b>	
<b>Optional components of EPP</b>			
<i><b>free choice according to the specialty</b></i>			
<i><b>Optional block 1 "Management of investment activity"</b></i>			
OC 1.1	Strategic project management: Business game "Project Capital Management" Business game "Strategy of investment in agro-industrial complex"	10	Exam, Course project
OC 1.2	Business game "Investment policy of agro-industrial complex enterprises"	6	Exam
<b>Total</b>		<b>16</b>	
<i><b>Optional block 2 "Management of international projects"</b></i>			
OC 2.1	Strategic project management: Business game "Project Capital Management"	10	Exam



Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
	Business game "Strategy for the implementation of the project in the agro-industrial complex"		
OC 2.2	Formation, management and development of the project team	6	Exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotation of disciplines in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Investment management.** Tasks, functions and organizational support of investment management. Methods of investment analysis. Investment planning. Principles of formation, methods of development and evaluation of the effectiveness of the investment strategy. Features of real investment management. Types of investment projects. Risk assessment of real investment projects. Formation of a real investment program. Management of investment projects. The structure of a real investment project. Risk optimization and evaluation of the effectiveness of a real investment project. Features of financial investment. Financial investment management policy. Evaluation of the effectiveness and risks of financial instruments. Management of financial investment portfolio formation.

**Macroeconomic analysis and investment strategy.** The content of macroeconomic analysis and its place in the system of sciences. The system of national accounts as a tool of macroeconomic analysis. Analysis of economic sectors. Analysis of macroeconomic imbalances. Macroeconomic policy analysis. Analysis of macroeconomic factors. Analysis of the effectiveness of strategic investment instruments. The essence of the investment strategy of the enterprise and the principles of its development. Methods of developing the investment strategy of the enterprise. Formation of strategic goals of investment activity. Substantiation of strategic directions and forms of investment activity. Evaluation of the effectiveness of the investment strategy.

**Project management.** The essence of project management. Features of agro-industrial complex project management. Basic processes in project management and their relationships. Project participants. Stages of project development. Project cost planning, methods and means of its evaluation. Features of control over the implementation of agricultural projects. Identification, assessment and methods of risk minimization in different phases of the project. Development of measures to minimize risks. Implementation of projects in the agro-industrial complex with the support of donor organizations, features of management. Project risk management. Technical and socio-cultural aspects of project management.

**Methodology and organization of scientific research with the basics of intellectual property.** Science and research in the modern world. Specifics of research activities, types and features of research. Characteristics of the general methodology of scientific developments. Characteristics of stages and registration of results of research works. Information retrieval technologies in the process of scientific work. Methods of preparation and design of publications, text writing techniques. Intellectual property: concepts, features. Basic institutes of intellectual property law. Sources of intellectual property law. Objects and subjects of intellectual property rights. Personal non-property

and intellectual property rights. Use of intellectual property. Protection of intellectual property rights.

**State mechanisms for managing investment programs and projects.** Formation of mechanisms of state management of investment process. State regulation of investment activity in Ukraine. Regulatory and legal support for the management of investment programs and projects. Establishment of mutual investment institutions. Formation of investment resources. Issues of management of public investment programs and projects. Attracting foreign investment and state regulation of international investment cooperation. Mechanisms of state management of investment programs and projects in financial markets. State investment management at the enterprise. Bank lending for investment processes. State instruments for stimulating and motivating investment activities of industrial enterprises. Mechanisms of state management of investment programs and projects in construction. Public management of financial portfolios. Investment factors to increase the competitiveness of the economy. Evaluation of the effectiveness of investment programs and projects.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of EPP**

**International programs and grants.** Research grants. State Fund for Basic Research. NATO grant programs. US Civilian Research and Development Foundation. Funds of European governments. Grants from the International Agency for Development in Culture, Education and Science (IADCES). Structural Funds of the European Union. Scholarships for study and research. Eureka International European Innovation Science and Technology Program. International Visegrad Foundation. Eurasia Foundation.

**Project approach in business management.** Business management systems and their combination. Project ideology and advantages of the project approach to business organization. Principles of project activity. Identification of problems affecting the level of project success. Model of project-oriented behavior of business entities. Development of applied principles of the project approach in business management.

**Project funding.** Theoretical principles of project financing. Project financing system. Project management in the project financing system. Evaluating the effectiveness of investment projects in the project financing system. Sources of project funding. Cost and structure of investment resources in project financing. Features of the organization of various forms and types of project financing. Banks in project financing. Project financing with the participation of international financial institutions. Features of project financing from EU funds.

**Marketing strategy in project management.** Management of marketing activities in the general management system of the enterprise. Marketing management functions. Trends and concepts of marketing management. Marketing activity of the enterprise as a process. Organization and stages of marketing management. Tasks and stages of organization of marketing activities. Organizational structure of marketing management. Interfunctional coordination of enterprise units in the process of performing marketing functions. Marketing strategic planning. Control as a means of improving the effectiveness and efficiency of marketing activities. Management of marketing tools.

**Information technology in project management:** The role and place of information systems and technologies in project management. Methods and methodology of designing information systems in project planning. System-methodological aspects of modeling in project management. Requirements for the project team and its manager, requirements for systems analyst. Means of structural analysis. CASE technologies. Data flow charts. Context diagrams. Professional and non-professional project management systems. Modern software for project management Microsoft Project 2010. Project

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resources in MS Project. Advanced features of MS Project. Primavera software package. Concept Draw software. MS Visio software. Project Expert software. CRM systems. **Scrum, agile, MS Project in project management.** Agile is a program development approach that reveals the philosophy of the approach through four main values: people and interactions are more important than processes and tools; a working program is more important than comprehensive documentation; cooperation with Customer is more important than agreeing on the terms of the contract; readiness for change is more important than going through the previous plan. Scrum is a project management methodology based on time management principles. Its main feature is the involvement of all participants in the process, and each participant has a role. The fact is that not only the team is working on the problem, but all those who are interested in solving the problem, not just set it and relax, but constantly "work" with the team, and this work does not mean only constant monitoring. **Creative technologies in social project management.** Application of creative technologies in personnel management in the contexts of external and internal environments: organizational culture, climate, socialization and mentoring; development of managers in the context of globalization. Management of individual factors: social perception, assessment of qualifications, skills, personality, mentality, introspection, emotions and attitudes towards the organization. Motivation: needs, job design, career satisfaction. Theories of equality, expectations and goal setting. Staff involvement and efficiency. Management of group factors and social processes: effective groups and teams, decision making, conflict management and negotiation, communication in the digital age. Organizational performance management. Contemporary leadership: situational, contextual and behavioral theories, charismatic and transactional leaders. Creating creative enterprises capable of transformation based on new experience and the requirements of a competitive business environment.

*Optional block 1. "Management of investment activity"*

**Strategic Project Management: Business Game "Project Capital Management".** Business game as a means of modeling the situation of making managerial decisions on project capital management. Creating several teams of players to solve the problem of solving the problem of optimizing the capital structure of the project, to be aware of the conceptual apparatus and types of capital value. To form the ability to think critically about models of determining the value of equity and theories of optimization of capital structure. To activate the ability to analyze and synthesize leverage as a characteristic of the economic potential of the enterprise / borrower. Enterprise restructuring as a way to increase the value of enterprise capital. Presentation of the obtained results. **Business game "Agricultural Investment Strategy".** Business game as a tool for modeling the situation of making managerial decisions on strategic project management. Creating several teams of players to solve the problem of forming a set of strategic alternatives and justify the choice of one of them in the management of a particular project. Investment management is a system of principles and methods of development and implementation of management decisions related to the implementation of various aspects of investment activities. Investment activity is closely related to other fundamental management systems of the enterprise with financial management through the formation of investment resources; with the production management, this connection is mediated through the joint management of the formation of fixed and working capital; with personnel management through the implementation of intellectual investment in employees of the enterprise.

**Business game "Investment policy of agro-industrial enterprises".** Business game as a means of modeling the situation of making managerial decisions on the formation of investment policy of agricultural enterprises. Creation of several teams of

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players to solve a specific problem of forming the investment policy of agricultural enterprises. Search and substantiation of the choice of the best of the alternative options for investment activities and building on this basis the investment strategy of enterprises, determining the mechanisms of their implementation. Formation of a portfolio of investment projects. Estimation of efficiency of investment policy of agro-industrial enterprises. Presentation of the obtained results.

*Optional block 2. "International Project Management"*

**Strategic Project Management: Business Game "Project Capital Management"**. The business game as a means of modeling the situation of making managerial decisions on project capital management. Creating several teams of players to solve the problem of solving the problem of optimizing the capital structure of the project, to be aware of the conceptual apparatus and types of capital value. To form the ability to think critically about models of determining the value of equity and theories of optimization of capital structure. To activate the ability to analyze and synthesize leverage as a characteristic of the economic potential of the enterprise / borrower. Enterprise restructuring as a way to increase the value of enterprise capital. Presentation of the obtained results. **Business game "Strategy for project implementation in the agro-industrial complex"**. Business game as a tool for modeling the situation of making managerial decisions on strategic project management. Creating several teams of players to solve the problem of forming a set of strategic alternatives and justify the choice of one of them in the management of a particular project. Initial conditions of the business game: the competitive position of the company, trends in the market in which the company is represented, strengths and weaknesses of the company and its competitors, determining competitive advantages and opportunities to strengthen them, the effectiveness of project integration into enterprise development strategy. Determining the conditions and options for resource provision of the project and choosing the best of them. Presentation of the obtained results.

**Formation, management and development of the project team.** Necessity and principles of project team formation. Methods and organizational aspects of team building. The main characteristics of the project team. Organization of team interaction. Psychological features of project team management. International project team management. Conflict management.

**Educational and research training program**

***Optional block "Management of international projects"***

The aim of the program is to train scientists in the field of investment activity research and management of international investment projects in the agro-industrial complex, which are able to research, analyze, develop and rationalize investment development concepts at the macro and micro levels, develop investment projects, select the most effective investment instruments and ensure the implementation of an effective investment strategy.

**Areas of employment of graduates**

Graduates will be able to work as project managers, coordinators and managers of international investment and business projects, investment managers, analysts and consultants, heads of investment departments at domestic enterprises of various sectors of the economy and spheres of activity, in international companies, research activity.

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### Practical training

Future masters on the example of preparing real international projects study the basic requirements for their writing and implementation, master the directions of grant activity of international organizations and governments of countries. As potential managers, they learn to manage international projects, acquiring knowledge of the practical aspects of finding sources of funding based on the analysis of international programs and grants, negotiating with potential partners in a complex investment environment.

### Proposed Topics of master's qualification thesis

1. International programs and grants as sources of project financing.
2. Development of a business plan for an international project for an agricultural enterprise.
3. Development of an investment project for an agricultural enterprise.
4. Management of the cost of an investment project.
5. Managing risks and changes in the project.
6. Management of the implementation of the investment project of an agricultural enterprise.
7. Development of a strategy for financing innovative projects.
8. Financial substantiation of programs at the stage of pre-project research.
9. Management of efficiency of investment projects of agricultural enterprises.
10. Risk management in investment projects of agricultural enterprises.

### Curriculum of Master training in educational program "Management of investment activity and international projects" (educational and research program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (papers), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 1	Investment Management	4	exam, course project
CC 2	Macroeconomic analysis and investment strategy	4	Exam
CC 3	Project Management:	8	Exam
	Project risk management Creative Technologies in Start-Up Project Management		Exam
CC 4	Methodology and organization of scientific research with the basics of intellectual property	4	Exam
CC 5	Scientific communications in master's research	4	Exam
<b>Total</b>		<b>24</b>	-
<b>Optional components of ERP</b>			
<b><i>free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional discipline 1	4	Credit
OCP 2	Optional discipline 2	4	Credit
<b>Total</b>		<b>8</b>	-
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of ERP</b>			
CC 6	International programs and grants	4	Exam
CC 7	Project approach in business management	4	Exam
CC 8	Project finance	4	Exam
CC 9	Marketing strategy in project management	4	Exam



**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (papers), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
CC 10	Information technologies in project management: Scrum, agile, MS Project in Project Management Creative technologies in the management of social projects	8	Exam
			Exam
CC 11	Practical training	20	Credit
CC 12	Preparation and defense of master's qualification thesis	20	master's thesis defense
<b>Total</b>		<b>64</b>	-
<b>Optional components of ERP</b>			
<b><i>free choice according to specialty</i></b>			
<b><i>Optional block "Management of international projects"</i></b>			
OC 1	Strategic project management of agroindustrial complex: Business game "Investment policy of agroindustrial complex enterprises" Business game "Management of international projects in the agro-industrial complex"	10	Exam
OC 2	Formation, management and development of the project team	6	exam, course project
OC 3	Research (scientific) practice	8	Credit
OC 4	Pedagogical (assistant) practice	8	Credit
<b>Total</b>		<b>24</b>	-
<b>The total amount of compulsory components</b>		<b>88</b>	-
<b>The total amount of optional components</b>		<b>32</b>	-
<b>THE TOTAL AMOUNT OF ERP</b>		<b>120</b>	

**Annotation of disciplines in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of ERP**

**Investment management.** Tasks, functions and organizational support of investment management. Methods of investment analysis. Investment planning. Principles of formation, methods of development and evaluation of the effectiveness of the investment strategy. Features of real investment management. Types of investment projects. Risk assessment of real investment projects. Formation of a real investment program. Management of investment projects. The structure of a real investment project. Risk optimization and evaluation of the effectiveness of a real investment project. Features of financial investment. Financial investment management policy. Evaluation of the effectiveness and risks of financial instruments. Management of financial investment portfolio formation.

**Macroeconomic analysis and investment strategy.** The content of macroeconomic analysis and its place in the system of sciences. The system of national accounts as a tool of macroeconomic analysis. Analysis of economic sectors. Analysis of macroeconomic imbalances. Macroeconomic policy analysis. Analysis of macroeconomic factors. Analysis of the effectiveness of strategic investment instruments. The essence of the investment strategy of the enterprise and the principles of its development. Methods of developing the investment strategy of the enterprise. Formation of strategic goals of investment activity. Substantiation of strategic directions and forms of investment activity. Evaluation of the effectiveness of the investment strategy.

**Project management.** The essence of project management. Features of agro-industrial complex project management. Basic processes in project management and their relationships. Project participants. Stages of project development. Project cost planning, methods and means of its evaluation. Features of control over the implementation of agricultural projects. Identification, assessment and methods of risk minimization in

different phases of the project. Development of measures to minimize risks. Implementation of projects in the agro-industrial complex with the support of donor organizations, features of management. Project risk management. Technical and socio-cultural aspects of project management.

**Methodology and organization of scientific research with the basics of intellectual property.** Science and research in the modern world. Specifics of research activities, types and features of research. Characteristics of the general methodology of scientific developments. Characteristics of stages and registration of results of research works. Information retrieval technologies in the process of scientific work. Methods of preparation and design of publications, text writing techniques. Intellectual property: concepts, features. Basic institutes of intellectual property law. Sources of intellectual property law. Objects and subjects of intellectual property rights. Personal non-property and intellectual property rights. Use of intellectual property. Protection of intellectual property rights.

**Scientific communications in master's research.** The course includes: acquaintance with the digital landscape and tools to support scientific communications of researchers; raising the level of digital competencies; creation of a personal educational environment and profiles for the identification of the researcher in the scientific space; review of regulations, initiatives and source base related to open science and open access, copyright for electronic content, ethics of electronic communications; gaining experience in research data management, scientific communication, presentation and propagation of research results in digital format and their evaluation; formation of the image of a scientist.

The practical part consist in the development of individual components: selection of scientific publications and implementation of the state of the research problem, preparation of a scientific article, development of a poster, computer presentation and master's portfolio, as well as effective online communication in conducting master's research.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of ERP**

**International programs and grants.** Research grants. State Fund for Basic Research. NATO grant programs. US Civilian Research and Development Foundation. Funds of European governments. Grants from the International Agency for Development in Culture, Education and Science (IADCES). Structural Funds of the European Union. Scholarships for study and research. Eureka International European Innovation Science and Technology Program. International Visegrad Foundation. Eurasia Foundation.

**Project approach in business management.** Business management systems and their combination. Project ideology and advantages of the project approach to business organization. Principles of project activity. Identification of problems affecting the level of project success. Model of project-oriented behavior of business entities. Development of applied principles of the project approach in business management.

**Project financing.** Theoretical principles of project financing. Project financing system. Project management in the project financing system. Evaluating the effectiveness of investment projects in the project financing system. Sources of project funding. Cost and structure of investment resources in project financing. Features of the organization of various forms and types of project financing. Banks in project financing. Project financing with the participation of international financial institutions. Features of project financing from EU funds.

**Marketing strategy in project management.** Management of marketing activities in the general management system of the enterprise. Marketing management functions. Trends and concepts of marketing management. Marketing activity of the enterprise as a

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process. Organization and stages of marketing management. Tasks and stages of organization of marketing activities. Organizational structure of marketing management. Interfunctional coordination of enterprise units in the process of performing marketing functions. Marketing strategic planning. Control as a means of improving the effectiveness and efficiency of marketing activities. Management of marketing tools.

**Information technology in project management:** The role and place of information systems and technologies in project management. Methods and methodology of designing information systems in project planning. System-methodological aspects of modeling in project management. Requirements for the project team and its manager, requirements for systems analyst. Means of structural analysis. CASE technologies. Data flow charts. Context diagrams. Professional and non-professional project management systems. Modern software for project management Microsoft Project 2010. Project resources in MS Project. Advanced features of MS Project. Primavera software package. Concept Draw software. MS Visio software. Project Expert software. CRM systems. **Scrum, agile, MS Project in project management.** Agile is a program development approach that reveals the philosophy of the approach through four main values: people and interactions are more important than processes and tools; a working program is more important than comprehensive documentation; cooperation with Customer is more important than agreeing on the terms of the contract; readiness for change is more important than going through the previous plan. Scrum is a project management methodology based on time management principles. Its main feature is the involvement of all participants in the process, and each participant has a role. The fact is that not only the team is working on the problem, but all those who are interested in solving the problem, not just set it and relax, but constantly "work" with the team, and this work does not mean only constant monitoring. **Creative technologies in social project management.** Application of creative technologies in personnel management in the contexts of external and internal environments: organizational culture, climate, socialization and mentoring; development of managers in the context of globalization. Management of individual factors: social perception, assessment of qualifications, skills, personality, mentality, introspection, emotions and attitudes towards the organization. Motivation: needs, job design, career satisfaction. Theories of equality, expectations and goal setting. Staff involvement and efficiency. Management of group factors and social processes: effective groups and teams, decision making, conflict management and negotiation, communication in the era of digital technologies. Organizational effectiveness management. Contemporary leadership: situational, contextual and behavioral theories, charismatic and transactional leaders. Creating creative enterprises capable of transformation based on new experience and the requirements of a competitive business environment.

*Optional block "Management of international projects"*

**Strategic management of agro-industrial complex projects: Business game "Investment policy of agro-industrial enterprises".** Business game as a means of modeling the situation of making managerial decisions on the formation of investment policy of agricultural enterprises. Creation of several teams of players to solve a specific problem of forming the investment policy of agricultural enterprises. Search and substantiation of the choice of the best of the alternative options for investment activities and building on this basis the investment strategy of enterprises, determining the mechanisms of their implementation. Formation of a portfolio of investment projects. Estimation of efficiency of investment policy of agro-industrial enterprises. Presentation of the obtained results.

**Business game "Management of international projects in agriculture".** Business game as a means of modeling the situation of making managerial decisions on

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the management of international projects in the agro-industrial complex. Creation of several teams of players to solve the problem of forming a set of strategic alternatives and justify the choice of one of them in the management of a specific international project in the agro-industrial complex. The initial conditions of the business game: the competitive position of the company, market trends in which the company is represented, strengths and weaknesses of the company and its competitors, determining competitive advantages and opportunities to strengthen them, the effectiveness of international projects in enterprise development strategy. Determining the conditions and options for resource provision of the project and choosing the best of them. Presentation of the obtained results

**Formation, management and development of the project team.** Necessity and principles of project team formation. Methods and organizational aspects of team building. The main characteristics of the project team. Organization of team interaction. Psychological features of project team management. International project team management. Conflict management.

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty 075 "MARKETING"  
educational program "MARKETING"**

Form of Training:	Licensed number of persons:
– Full-time	60
– Part-time	60
Duration of training	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian, English
Qualification of graduates	Master of marketing

**The concept of training**

The program in the specialty is aimed at training marketing specialists able to work in the field of marketing, advertising, logistics, market research and forecasting, international marketing and trade. Masters in the specialty are able to form a company market strategy, ensure the competitiveness of enterprises, develop and implement marketing operational plans of a company; organize foreign economic activity of an enterprise in accordance with the international marketing principles; organize distribution systems such as “just in time”, “door to door” etc.; organize company communication policy and performance in an unstable environment; prevent adverse factors and crises; assess risk factors, measure their size and manage them when implementing marketing activities.

**Educational and professional program of master's training**

***Optional Block "Advertising Management"***

Training of specialists in advertising project management, organization and quality management of an advertising project and its implementation. The objective is to provide students with the knowledge of modern communication technologies, advertising projects management methods, standards and technology of development and implementation of promotional activities.

**Areas of employment for graduates**

Advertising agencies and advertising departments of enterprises and organizations.

***Optional Block "Trade marketing"***

The aim of the master's program is to train experts in marketing and intermediary activities with a high level of professionalism and culture, competence and responsibility, able to perform the basic functions of business, to use various marketing tools to promote goods from producer to consumer, introduce new organizational and economic technologies in the field of marketing. It is to train specialists in marketing logistics who are competent, professional and responsible to perform basic logistics functions, to facilitate the effective promotion of the goods from producer to consumer, to introduce new organizational and economic technologies in the field of marketing. The program provides

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training of highly qualified managers, able to creatively apply innovative methods in the field of logistics

### Areas of employment for graduates

Businesses and organizations engaged in intermediary activity; marketing and sales departments of enterprises of different organizational and economic forms. Logistics companies and logistics divisions of large enterprises

### Practical training

Using case methods masters in marketing explore the specific characteristics of agricultural production as a commodity, mechanisms of formation and implementation of marketing strategies, pricing strategies and the peculiarities of marketing pricing, sales, advertising management. As potential leaders they learn to manage marketing departments, acquire knowledge of the practical aspects of the market and their impact on the development of the company, the competitive environment and the market on the whole, to determine the role of professional marketers in the economic system of the state in the increasing global competition, globalization and modern challenges.

### Proposed Topics of Master's qualification Thesis

1. Development of product promotion strategies to the market.
2. Development of product marketing strategy.
3. Improvement of agricultural enterprise activity on the basis of market research.
4. Organization of marketing activity at the enterprise.
5. Organization of business on the basis of marketing.
6. Formation of communication policy of an enterprise on domestic (foreign) market.
7. Transportation management in modern transport logistics.
8. Rationale of marketing distribution policy.
9. Management of marketing activities at the enterprise.
10. Formation of competitive strategy of the enterprise in the market.

### Curriculum of Master training in educational program "Marketing" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Agrarian Policy	4	exam
CC 2	Methodology of scientific research	4	exam
CC 3	Management of enterprise competitiveness	4	exam
CC 4	Forecasting methods in marketing research	4	exam
CC 5	Corporate social responsibility	4	exam
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional discipline 1	4	Credit
OCP 2	Optional discipline 2	4	Credit
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 6	Strategic Marketing	4	exam
CC 7	Logistics management	4	exam

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
CC 8	Advertising management	4	exam
CC 9	Marketing Management	4	exam
CC 10	Marketing planning	4	exam
CC 11	Production practice	12	
CC 12	Preparation and defense of master's qualification thesis	14	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty</i></b>			
<b><i>Optional Block 1. "Advertising management"</i></b>			
OC 1.1	Creativity in advertising	4	exam
OC 1.2	Psychology of Advertising	4	exam
OC 1.3	Speechwriting	4	exam
OC 1.4	Brand Management	4	exam
<b><i>Optional Block 2. "Trade marketing"</i></b>			
OC 2.1	Organization and technology of wholesale and retail trade	4	exam
OC 2.2	E-commerce	4	exam
OC 2.3	Merchandising	4	exam
OC 2.4	Commercial activity of intermediary enterprises	4	exam
<b>The total amount of optional components</b>		<b>24</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of disciplines in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of EPP**

**Agricultural policy.** The discipline introduces future professionals to the basics of policy-making in agriculture. The students study both domestic and foreign experience and get an opportunity to form professional opinion about the processes and phenomena in the agricultural sector of the national economy.

**Methodology and organization of scientific research with the principles of intellectual property.** The aim of the discipline is to develop the system of knowledge of methodology, theory of method and research process, methodological support of research activities at the stages of writing master thesis, to form the ability to organize scientific research of problem using the whole complex of traditional methods of research, including general and special methods, laws and categories of dialectics, economic laws and categories of economic and statistical methods, economic-mathematical modeling etc. The main objective of the theoretical part of the course is to introduce students to modern concepts of research activities with the principles of scientific cognition and methods of scientific research. The main objectives of the practical part are to develop abilities of self-education, development of skills: formation and use of conscious methodological position of scientific research. The learning outcomes are: improvement of skills in searching, selecting and processing scientific information, exact formulation of the problem, purpose, objectives, object, subject and methods of research. Students are expected to learn the principles of intellectual property and master the knowledge and skills regarding registration of ownership, protection, commercialization, evaluation and management.

**Management of enterprise competitiveness.** The aim of the discipline is to deepen the theoretical knowledge, to master modern methods and practical skills of effective management of enterprise competitiveness based on marketing in modern business environment. The objectives of the course are: awareness of the role and importance of the problems of company competitiveness management; profound

knowledge of the role and place of marketing in management of enterprise competitiveness; synthesis of theoretical knowledge and practical skills in forming competitive status of a company and its management in specific practical situations.

**Forecasting methods in marketing research.** The aim of discipline is to develop students' knowledge and skills in the theory and methodology of forecasting market research of macro- and micro-markets, products / services. The discipline studies methodological and technological principles of research methods and processes and forecasting of economic entities and the conditions of the business environment. The program includes two modules: the theoretical foundations of forecasting for marketing research; quantitative forecasting methods in marketing research.

**Corporate social responsibility.** The purpose of the discipline: to form students' fundamental knowledge of the theory and practice of social responsibility and relevant professional competencies. Tasks of the discipline: study of theoretical positions and practice of interaction of the state, business, society and man in the field of social responsibility as a condition for sustainable development of society.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Strategic Marketing.** The aim of the discipline is to master theoretical and methodological principles of strategy formation and practical skills in strategic decision-making in marketing management and market development of an enterprise. The main tasks of the discipline is to provide theoretical training of students and formation of skills in strategic marketing analysis, market segmentation, positioning, development of general, competitive and functional strategies, searching and keeping competitive advantages.

**Logistics Management.** The aim is to master theoretical principles, the basic categories of logistics management and methodological aspects of organization and management of logistics activities in modern conditions.

**Advertising management.** The aim of discipline is to form a system of theoretical and applied knowledge of advertising management, strategy and tactics of advertising in Ukraine. The main tasks of the discipline are to study the issues of advertising planning, stages of creating advertising messages, the sphere of advertising management application, knowledge of the characteristics of the main participants of the process, to provide students with practical skills for marketing service. The student explore approaches to creating advertising, its movement on the market and evaluation of effectiveness.

**Marketing Management.** The discipline studies the system of administrative relations in marketing departments and their relationship with other business units. The aim is the formation of the modern approaches to understanding marketing management abilities to achieve the transition to a new level and forms of consumption by situational market analysis, forecasting the evolution of consumer needs and strategic planning of stimulating goods and services movement, sales, providing increased entrepreneurial resistance on the domestic market. The main tasks of discipline are to provide competences in basic opportunities of marketing management for broad entrepreneurial activity in various organizations and environments.

**Marketing planning.** The aim of the discipline is to provide knowledge and practical skills in drawing up marketing plans, managing the process of their implementation, forming and maintaining consumer demand for goods and services, identifying target segments, plan benchmarking. The objective of the discipline is to study phases, functional structure and information support of marketing planning system. The discipline studies marketing planning process and factors affecting it. The students learn methods and techniques to perform planning management in specific situations.

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**Optional components of EPP**  
**Free choice according to specialty**  
*Optional Block 1 "Advertising Management"*

**Creativity in advertising.** The aim of the discipline is to provide students with knowledge of methods and technologies of creativity in advertising by means of media and graphic art, to form creative thinking, practical skills and abilities in advertising and the use of specialized and reference books on creativity in practical economic activity. The objective of the discipline is to learn the basic directions of creative activity in advertising; principles and methodological approaches to generation of new ideas in advertising from the positions of different creative schools; to be able to analyze the effectiveness of advertising messages in different media.

**Psychology of advertising.** The aim of the discipline is to provide students with theoretical knowledge and practical skills in the field of advertising psychology and in the dynamics of psychological processes of interaction in the system "advertising to consumer" to address the psychological challenges of designing effective advertising images of products (services); to form skills of creating and using special advertising psycho-technologies to promote products on the market. The task of the course is to teach students to form effective advertising images (image) of goods (services) in target groups, as well as provide methods of memorizing advertising messages, implement effective advertising influence on consumer behavior, arouse a desire to buy a product (service) advertised.

**Speechwriting.** The purpose of the study of the discipline "Speechwriting" is the acquisition of knowledge and practical skills in writing texts and speeches, the circumstances of their proclamation, the students of the place of speech in the system of preparation of a specialist in advertising and public relations, definition of the role of public speeches in the process of forming the marketing positions of the subject social communications; acquaintance with the history of the formation and development of science of rhetoric and oratory; study of the laws of public broadcasting; awareness of the psychological foundations of the activities of the speaker and speaker; familiarization with the main means of persuasion and verbal influence on the audience, with the main means of implementing non-verbal influence on the audience, with the composition of speech, with the specifics of the preparation of various types of speeches in the circumstances of the speech, the specifics of the preparation of various types of speeches on their psychological motives; with the specifics of the preparation of various types of speeches in the sphere and the target direction; analysis of public speeches.

**Brand management.** The main role of brand management is to integrate the processes of creation, management and evaluation of brands aimed at increasing their value to consumers. The aim of the discipline is to provide students with theoretical knowledge and practical skills in brand creation and management, brand strategy realization in order to achieve the maximum business efficiency. The objective is to form competencies in the following areas: the nature and principles of brand management at an enterprise, the purpose and prerequisites for effective brand management; to teach students to create their own brands, manage brand assets, develop and support the brand strategy. The subject of the discipline covers methods and processes which the enterprise applies to create brands and manage their assets.

*Optional Block 2. "Trade marketing"*

**Organizing and technology of wholesale and retailing.** The aim of the discipline is to develop knowledge and skills in sustainable construction of commercial enterprises, the ability to design commercial and technological processes, to introduce scientific and technological progress into trade. The task of the course is to understand and study the

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complex of issues that reveal the content and peculiarities of retailing. Particular attention is focused on the principles of trade, the factors that influence the effectiveness of trade and technological processes, methods of retail sale. The discipline covers peculiarities of organization and planning of direct sales, the sequence of operations in the process of direct selling, methods and algorithms for decision making as to personal selling process in any form of economy. The aim of the course is to provide students with knowledge of efficient sales and service, up-to-date genuine industrial, institutional and scientific decision-making. The objectives of the course are to introduce students to the relevant categories of direct selling, the requirements for sales representatives, peculiarities of successful product presentation; the use practical skills in direct selling; instilling a desire to creatively improve the process of product selling in the current market conditions in Ukraine.

**Electronic commerce.** The discipline provides the essence, content and role of e-commerce in the modern sector of world and national economy. E-commerce tools, its scope and the main principles are considered regarding the global Internet. Special attention is focused on characteristics of basic forms and e-commerce projects (including electronic shopping, electronic auctions, electronic trading platforms) electronic payments, the specifics of providing individual services. The effectiveness of e-commerce and its legal support are analyzed.

**Merchandising.** The discipline provides coverage of such issues as: control of inventory in retail trade; effective product placement in stores; marketing communications at points of sale; the effectiveness of the sales staff. The aim of the discipline is to provide students with knowledge and skills on modern techniques, mechanisms and instruments of merchandising. The tasks of the course are aimed at developing students' competence as to: display of goods on the exposition equipment, distribution of promotional materials in retail locations, the possibility of presenting the maximum possible range of goods.

**Commercial activities of intermediary companies.** The discipline studies modern approaches to the possibility of commercial management of intermediary enterprises in order to transfer to modern technologies, strategies, purchase and sale tactics; the use and application of modern forms, methods of commercial transactions for the effective operation of business intermediary companies.

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## **FACULTY OF INFORMATION TECHNOLOGY**

**Dean** – Dr.Sc. in Pedagogics, associate professor Olena Glazunova

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Location: Building 15, room 201

Faculty organizes and coordinates educational process of master training in educational programs within specialties:

### **Specialty 051 "Economy"**

#### ***Educational program "Economic Cybernetics"***

Guarantor of the educational and professional program – Dr.Sc. in Economics, professor, Nataliia Poprozman

Graduating department:

***Economic Cybernetics***

Tel.: (044) 527-85-67

E-mail: ciber\_chair@nubip.edu.ua

Head of department – Dr.Sc. in Economics, professor, Dmytro Zherlitsyn

### **Specialty 121 "Software engineering"**

#### ***Educational programs "The software of information systems"***

Guarantor of the educational and professional program – Ph.D. in Engineering, associate professor Bella Golub

Graduating department:

**Computer Sciences**

Tel.: (044) 527-87-23

E-mail: iusprog@nubip.edu.ua

Head of department – Ph.D. in Engineering, associate professor Bella Golub

### **Specialty 122 "Computer science"**

#### ***Educational programs "Information Managing Systems and Technologies"***

Guarantor of the educational and professional program – Ph.D. in Economics, Oleg Gustera

#### ***Educational program "Computer Ecological and Economic Monitoring"***

Guarantor of the educational and professional program – Ph.D. in Engineering, associate professor Ruslan Basarab

Graduating department:

**Computer Sciences**

Tel.: (044) 527-87-23

E-mail: iusprog@nubip.edu.ua

Head of department – Ph.D. in Engineering, associate professor Bella Golub

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**Specialty 123 "*Computer engineering*"**

***Educational programs "Computer systems and networks"***

Guarantor of the educational and professional program – Ph.D. in Engineering,  
associate professor Borys Gusyev

Graduating department:

**Computer Systems, Networks and Cybersecurity**

Тел.: (044) 527-81-99

E-mail: [csn@it.nubip.edu.ua](mailto:csn@it.nubip.edu.ua)

Head of the department – Dr.Sc. in Engineering, professor Valerii Lakhno

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**Training of masters of sciences  
in branch of knowledge "Social and Behavioral Sciences"  
in specialty 051 "ECONOMY"  
educational program "ECONOMIC CYBERNETICS"**

Form of training:	Licensed number of students:
– full-time	25
Duration of Training:	
– full-time educational and professional program	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian
Qualification of graduates	Master in economic cybernetics

**The concept of training**

Master in economic cybernetics should have knowledge in economics, analysis and economic systems behavior research, the theory and practice of decision-making, market development modeling, management, marketing, economic and legal relations. The course is based on a knowledge from the special mathematical disciplines, theoretical and professional knowledge of modern information technologies and use of computer technology in the economy. The knowledge learned on the course make possible to develop systems of models for socio-economic studying phenomena on practice and for research purposes, to create and use static and dynamic expert systems for business processes in agriculture.

**Educational and professional program of master's training**

This program helps students develop a comprehensive understanding of enterprise-wide management for all foreseeable threats. Our graduates are well-prepared to tackle the organizational challenges relating to: risk assessment, response, communication and monitoring, regulatory compliance, and crisis management.

The program explores the individual elements of organizational risk management utilizing the emerging enterprise risk management principles and standards. Students have the opportunity to attain a comprehensive and deep understanding of how leading organizations successfully deal with both upside and downside risks in a manner that increases companies value and assures the continuity of operations.

**Areas of employment of graduates**

The Master's program provides an in depth understanding of risk and their application in practice both for financial and non-financial organizations. This program is designed to provide you with the skills to excel in a role as a risk manager, risk and insurance manager, risk analyst or clinical risk manager within a variety of organizations and sectors. Therefore, they can be employed as: head of research center of economic, financial and accounting information processing, head of information technology department, administrator of tasks and systems, database administrator, computer systems analyst etc.

**Practical training**

Aimed at the mastering of basic methods of: scientific problem formation, evaluation of necessary information data sets, conducting of analytical, optimization and forecasting

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developments based on information technology and estimation of economic effects of their implementation in practice and research.

### Proposed Topics for Master qualification Theses

1. Agricultural risks in terms of incompleteness institutional changes.
2. Risks evaluation of full scale agricultural sector taxation.
3. 4. Real risks evaluation of agricultural sector crediting.
4. Influence of agriculture manager risk aversion on business structure.
5. Risk assessment of innovation in the agricultural business.
6. Ecological and economic component modeling of the agricultural innovative processes.
7. Size dependent farm optimization problem modeling in agricultural sector.
8. Sustainable economic growth and longtime optimization.
9. The use of financial and tax reporting in the environmental and economic modeling.
10. The methodology of forecasting key indicators of regional socio-economic development.

### Curriculum of Master training in educational program "Economic cybernetics" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1.	Global Economy	4	exam
CC 2.	Global Information Resources	4	exam
CC 3.	Methodology and organization of research on the basics of intellectual property	4	exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC4.	Business Process Modeling	4	exam
CC5.	Project management models	4	exam
CC6.	Applied Econometrics	4	exam
CC7.	Intellectual Data Analysis	4	exam
CC8.	Risk management models	6	exam
CC9.	Work Practice	2	
CC10.	Research practice	15	
CC11.	Preparation and defense of Master's qualification thesis	15	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Digital economy"</i>			
OC 1.1	Blockchain technologies	4	exam
OC 1.2	Big Data Analytics	4	exam
OC 1.3	Modeling with R	4	exam
OC 1.4	Developing of Web Applications	4	exam
<i>Optional Block 2. "Risk management"</i>			
OC 2.1	Innovation agriculture risk	4	exam
OC 2.2	Methods and models of enterprise competitiveness	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
	management		
OC 2.3	Ecological and Economic Risks	4	exam
OC 2.4	Modeling and Forecasting in environmental management	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Global Economy.** The economic nature of global transformations. Of the global economy. Regulatory institutions of the global economy. Political economy of the global economic cycle. Mechanisms of functioning of global markets. Competitive leadership of global corporations. The process of the global economy. Technological resources of global economic development. The human resources of the global economy. Civilization dimensions of global economic processes. Global context of Ukrainian economy.

**Global Information Resources.** Information and copyright. Intellectual property. Internet as a source of scientific information. Finding information on the Internet. Search engines: universal and specialized. Internet space scientific information. Agricultural resources in the web. Resources FAO, network AgroWeb. Finding and presenting data. Presentation of research data

**Methodology and organization of research on the basics of intellectual property.** Organizational structure of the scientific team. Planning of research. Conducting research and experimental design in the research work. Intellectual Property Law as the results of human creativity. Intellectual property. State System of Intellectual Property. The international intellectual property system. The right of intellectual property as an investment and goods. Valuation of intellectual property. Protection of intellectual property rights.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Business Process Modeling.** The concept and relevance of a business process. The dimensions of model quality and their measurement. The process of modeling and modeling methods. The social dimensions of the modeling process: roles, group behavior, consensus building. The Business Model Canvas: A Tool for Entrepreneurs and Innovators. The Customer Segments. The Value Propositions. Channels and Customer Relationships. Revenue Streams and Key Resources. Key Activities and Key Partnerships. The Cost Structure. Presenting the Business Model.

**Project management models.** Project management environment. System approach in project management. Project analysis. Investment research and project financing. Business project planning. Project management software and hardware. Project activity

**Applied econometrics.** Investigation of current economic problems in the incompleteness of institutional transformations conditions. Models of domestic food market construction in the open economy country. Effectiveness of different forms of agribusiness modeling by econometric methods. Forecasting trends of the world economy, and its influence on the development of national agricultural production



**Intellectual Data Analysis.** Basic concepts. Model complexity. Linear classifier. The problem of linear resolution. The method of support vectors. Gradient methods of teaching the first and the second grade. Gradient methods of teaching first and second grade. Stochastic learning methods. Matrix algorithms for classification. General principles of self-organization of systems. Reducing dimension models. Dynamic classifiers. Optimization models. Fuzzy classifiers. Bayesian solution. Algorithmic composition.

**Risk management models.** The Nature of Risk: Losses and Opportunities. Risk Measurement and Metrics. Risk Attitudes and Expected Utility Theory. Risk Management: Fundamental Tools. The Evolution of Risk Management: Enterprise Risk Management. Risk Management: Advanced Tools. Risk Modeling.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1 "Digital economy"*

**Blockchain technologies.** Principles of operation of blockchain technology, basic forms and methods of cryptocurrency mining; mechanism for conducting and approving cryptocurrency transactions, principles of creation and operation of smart contracts, basic features of Solidity programming language; areas of application of blockchain technology

**Big Data Analytics.** The concept of large data (Big Data). Structured and unstructured data. Relational and non-relational databases and data warehouses. Technology processing large amounts of data Introduction to Hadoop and typical examples of use. System Architecture Hadoop. Working with HDFS – distributed file system Hadoop. MapReduce: methodology and technology of distributed computing. Hadoop and data warehouse, application data storage Apache Hive; Apache Pig - a platform for analyzing large data sets; HBase – DBMS for processing large data sets. The use of large data analysis technology in business.

**Modeling with R.** R language essentials. The R environment. Probability and distributions. Simple linear regression. Residuals and fitted values. Prediction and confidence bands. Correlation. Multiple regression. Model specification and output. Model search. Linear models. Nonlinear curve fitting. Self-starting models.

**Developing of Web Applications.** The concepts complete application creation in the web-environment. Languages HTML, JAVASCRIPT, PHP. Creation of dynamic web-sites. Basic concepts of information and its presentation in a web-environment. The principles of the databases using in a web-environment, the possibility of web-sites creation by using a variety of software tools and their combinations

##### *Optional Block 2. «Risk management»*

**Innovation agriculture risk.** Agricultural production risks classification. Quantitative evaluation methods of agricultural risks. Financing agricultural innovation in terms of macroeconomic instability. The innovation impact on the scale of the risk assessment. Liquidity (farms, households, businesses) and advisory function. Wood innovative solutions and riskless return in the agricultural business. Methods of risk reducing in agricultural innovation.

#### **Methods and models of enterprise competitiveness management.**

Features of enterprise competitiveness management by applying the method of system approach. Methods for assessing the competitiveness of enterprises using data from the financial statements of companies. Modeling the impact of the index and sub-indices of global competitiveness on the public welfare of the country as a whole and enterprises in the field of information and communication technologies.

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**Ecological and economic risks.** Sustainable development conception and using opportunities for modern agricultural production development. The function of social welfare in applications to the problem of environmental management. Optimization model of environmental management. Global model biomass optimization. Comprehensive environmental and climate model to assess the potential of agriculture.

**Modelling and forecast in environmental sphere.** The use of simulation in the study and design of complex systems. Classification of mathematical models according to the properties of the processes modelled. The order of development of mathematical models in the field of environmental management. The principle of material balance. Probabilistic models of the application. Linear regression models. Models Monte Carlo. Types and methods of forecasting. Tools for simulation and prediction.

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**Training of masters of sciences  
in branch of knowledge "Information technology"  
in specialty 121 "SOFTWARE ENGINEERING"  
educational program "THE SOFTWARE OF INFORMATION SYSTEMS"**

Form of training:	Licensed number of students:
– full-time	25
Duration of Training:	
– full-time educational and professional program	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian
Qualification of graduates	Software engineer MSc in Software Engineering

**The concept of training**

The main focus of this program is to provide high-quality training for highly qualified information technology and software (software) professionals who are able to solve complex and non-standard applied, scientific and innovative problems in the field of software engineering. The program aims to develop in the future specialist the ability to combine general and professional knowledge, skills, communication skills, autonomous activity and responsibility.

**Educational and professional program of master's training**

The educational program is focused on mastering modern approaches and technologies of software design, development and quality control. Students will have problem-oriented lectures, project decisions implementation (individual and team) at practical and laboratory classes. The program's content takes into account the life-science orientation of the university, as well as the modern information technologies in the agrarian and environmental spheres are hardly important for Ukraine.

**Areas of employment for graduates**

Future specialists will work in IT industry and perform software development and support. The graduates will mainly occupy such positions, as (according to the "State Classifier of Work Positions"): software developer; software engineer; software quality control engineer (QA); information systems architect; data analyst; researcher; mentor of IT courses and trainings etc.

**Practical Training**

We provide interactive trainings in close collaboration with lecturers and academic group. We are always trying to perform active discussions with lecturers during lectures, laboratory and practical classes. Some courses includes complex project, which requires team work on design research and development. The defense of the master's study is public. Students have the opportunity to participate in research projects and conferences.

**Proposed Topics of Master's qualification Thesis**

1. Software for intelligent systems of classification of a vegetation state according to average resolution satellite data.
  2. Software for agricultural accounting information system.
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3. Software for the system land pollution state estimation on the basis of geospatial data.
4. Google Earth based monitoring system software.
5. Software for monitoring the condition of crops with a mobile client.
6. Small business decision support system software (for different areas).
7. Software of technological process control system of agrarian enterprise with intelligent module.
8. Software for regional public transport routing system with analytical module.

**Curriculum of Master's training  
in educational program "The Software of Information Systems"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Special math sections for programmers	4	exam
CC 2	Methodology and organization of scientific research	4	exam
<b>Optional components of EPP</b>			
<i>free choice according to the preferences of students in the list of subjects</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Software project management	4	exam
CC 4	High-performance computer systems	4	exam
CC 5	Data warehousing	5	exam
CC 6	Software for embedded systems	4	exam
CC 7	The methods and information technologies for risk assessment	5	exam
CC 8	Artificial intelligence systems programming	4	exam
CC 9	Work Practice	2	test
CC 10	Internship	20	test
CC 11	Preparation and defense of Master's qualification thesis	10	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Programming methodology"</i>			
OC 1.1	Principles of distributed and network programming	4	exam
OC 1.2	Object modeling and design for complex systems	4	exam
OC 1.3	Patterns of object-oriented design and programming	4	exam
OC 1.4	Theory of formal languages and compiling	4	exam
<i>Optional Block 2 "Data science"</i>			
OC 2.1	Modeling and forecasting in environmental management	4	exam
OC 2.2	Big Data technology	4	exam
OC 2.3	Data Mining technology	4	exam
OC 2.4	Web applications development	4	exam
<i>Optional Block 3 "Intelligent systems"</i>			
OC 3.1	Methods of expert systems building	4	exam
OC 3.2	Intellectual environmental monitoring systems	4	exam
OC 3.3	Digital signals and images processing	4	exam
<i>Optional Block 4 "Embedded systems and Internet of Things"</i>			
OC 4.1	Robotic management systems	4	exam
OC 4.2	Hardware and software for collecting and processing environmental information	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 4.3	Technologies of IoT systems designing	4	exam
OC 4.4	Protocols for data transferring in IoT systems	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE

##### Compulsory components of EPP

**Special math sections for programmers.** Additional mathematics sections required for data analysis, modeling, and applied monitoring tasks.

**Methodology and organization of scientific research.** This discipline is directed to acquire the formation of the modern level of scientific and information culture; the acquisition of systematic knowledge about the essence, nature, structure, patterns, and methodology of scientific research; the development of competencies necessary for the independent pursuit of scientific research and the acquisition of new knowledge, processing, and presentation of the results performed scientific work, masters preparation for professional activities. Students will get acquainted with the concepts of the quality of scientific research, scientific novelty, ethics in science, plagiarism and the principles of combating it, as well as requirements for the main types of scientific and qualification work. Particular attention is paid to the practical trainings and the ability to use a systematic approaches in planning, organizing and conducting research, in finding and processing scientific information, analyzing information sources and summarizing the obtained materials, interpreting the results of scientific research and formulating conclusions. The discipline provides the development of skills directly related to the preparation, design, and protection of master's qualification papers.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE

##### Compulsory components of EPP

**Software project management.** The main subject if this discipline is the obtaining the theoretical knowledge and practical skills in the methodology of software project management. Task of the discipline: to study the theoretical, methodological and organizational foundations of project management; familiarization with the concept of the software project, its elements and their properties, classification and environment of the projects, life cycle of the software project; mastering the project structuring models and the process, familiarization with the software projects management functions; mastering the management of the main characteristics of the project; mastering the project management methods, software tools and computer technologies that are focused on project management; acquiring the skills in usage the project management methodologies; acquisition of practical skills in solving tasks of project management for the development and use of information systems and technologies at enterprises and organizations.

**High-performance computer systems.** This discipline has several main subjects, they are: peculiarities of the architecture of high-performance systems, approaches to the construction and use of distributed and multiprocessor systems, the implementation of parallelism in calculations, vector data processing, and the peculiarities of the structure and operation of quantum computers are studied. Also we considerate some attention to the data security issues and the peculiarities of creating and optimizing software designed to work on high-performance systems.



**Data warehousing.** Models database. Query language. Physical storage, access methods and query processing. Transaction management, concurrency control and crash recovery. Security database. Parallel and distributed databases. Data warehousing and data mining. Concepts and Data Model OLAP. The structure of OLAP-cube. Deployment Services Analysis Services. Determination submission of data sources in the project services Analysis Services.

**Software for embedded systems.** This discipline studies: general principles and technical features of the development of integrated systems for controlling various equipment. In this course we considerate the necessity of information for the construction of microprocessor control systems for specialized equipment. WE also solve some tasks of the complex embedded software creating.

**The Methods and Information Technologies for Risk Assessment.** This discipline carries a large amount of mathematical formulas and researches in the area of the theory of probabilities. It implies: Introduction to the complex software solutions and related economic / environmental / social risks; analysis and the correct assessment of all possible risks at different stages of software life cycles; the mathematical forecasting of possible risks and expenses with the software design and implementation; development of modern methods, approaches and instrumental solutions for risk assessment.

**Artificial intelligence systems programming.** This discipline consider the modern methods and models of artificial intelligence, applicable to the design and implementation of decision support systems, systems for collecting, processing and analyzing large volumes of heterogeneous information. Also this discipline implies having Python and R programming languages, at least on an average level, for the implementation of the processor for intelligent analysis and data processing.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1 "Programming methodology"*

**Principles of distributed and network programming.** The main aim of this course is the learning of fundamentals of designing distributed program systems (including multi-user information systems) and their implementation through the use of modern software development. Special attention is paid to the role of standards of information sharing, storing and visualization.

**Object modeling and design for complex systems.** Object-oriented analysis and design. Domain modelling. Object model. Iterative software development technology of complex systems using object-oriented approach.

**Patterns of object-oriented design and programming.** Design patterns that can be implemented in standard object-oriented languages.

**Theory of formal languages and compilation.** In-depth familiarization of mathematical linguistics and the theory of formal languages. Grammar, formal language classifications, regular expressions, finite automata, context-free grammars, basic algorithmic problems. Methods of translators constructing.

##### *Optional Block 2 "Data science"*

**Modeling and forecasting in the field of nature management.** Simulation as the method of scientific knowledge. The use of simulation in the study and design of complex systems. Classification of mathematical models according to the properties of the processes modelled. The order of development of mathematical models in the field of environmental management. The principle of material balance. Probabilistic models of the application processes. Models of data visualization obtained through observation. Linear regression models. Monte Carlo Models. Types and methods of forecasting. Tools for

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simulation and forecasting. Microsoft Excel and MathCad tools for simulation and forecasting.

**Big Data Technologies.** Big Data technologies let to handle large volumes of information accumulated by organizations and make on its basis more balanced management decisions, better understand the customers and business processes. Introduction to Big Data systems. Description of features of real-time data processing. Corresponding tools usage. The ability to expand knowledge and skills beyond the traditional databases.

**Data Mining Technologies.** Data Mining Technology, Data Mining techniques for classification, regression, associative rules search, clustering tasks solving. Data Mining technique usage while constructing the analytical systems.

**Web applications development.** Internet services. Server and client side of the Internet. Main Internet and web protocols. HTML, CSS, Java Script, AJAX. HTML extensions. Create web applications using different server-side programming languages.

### *Optional Block 3 "Intelligent systems"*

**Methods of expert systems building.** Main concepts of expert systems. Knowledge bases, production subsystem. Methods of forming expert recommendations. Tools for expert systems development.

**Intellectual environmental monitoring systems.** The purpose of studying the discipline "Intellectual computer monitoring systems" is to format the skills in solving problems that are difficult to formalize. To provide the knowledge on assessing the status and trends in the development of information systems (monitoring); the information technologies for solving management tasks are related to the use of artificial intelligence tools and techniques; the means to develop and to use an intelligent information systems in various applied fields.

**Digital signals and images processing.** The main objective of this discipline is studying of modern methods and tools for processing the digital information. In particular, students will learn more about: models of signal representation, image sampling methods, reconstruction, transformation, filtering, compression, statistical processing, protection of digital content, basis of spectral analysis, etc. Applied applications, state and prospects of research in this direction are also studied.

### *Optional Block 4 "Embedded systems and Internet of Things"*

**Robotic management systems.** Purpose, classification and problems of robot control systems. Structure, the basic components of robotic control systems. Intelligent robotic systems. The system of perception and recognition of information. Knowledge management system, problem solving and formation control actions. The system of environmental impact. Principles of robots and robotic systems. System design, manufacturing, robotics control systems. Applications robots and robotic systems in the agro-industrial complex.

**Hardware and software for collecting and processing environmental information.** Architecture modern distributed systems of collection and processing. Classification of sensors automatically collect environmental data. Algorithms automatically gathering and initial processing. Real time operating system. Research and programming languages. Local area network. Algorithms analytical data processing subsystem upper level. Drafting the collection and processing of environmental information.

**Technologies of IoT systems designing.** IoT systems general concepts and structure. Methodology of computer IoT systems designing (CS IoT). Levels of IoT design – system, operational, functional, technical. Data operation Conveyor of IoT systems.

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Standards and technologies. Modern methods and technologies design of hardware and software IoT systems designing.

**Protocols for data transferring in IoT systems.** Data transmission protocols in IoT systems. Design of IoT-systems based on software-defined networks and research of appropriate data transmission protocols. Stack of data transmission protocols, in particular MQTT, CoAP, OpenFlow protocols. Means of automation of configuration and testing of software-defined networks.

**Training of masters of sciences  
in branch of knowledge "Information technology"  
in specialty 122 "COMPUTER SCIENCE"  
educational program "INFORMATION MANAGING SYSTEMS AND TECHNOLOGIES"**

Form of training:	Licensed number of students:
– full-time	25
Duration of Training:	
– full-time educational and professional program	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian
Qualification of graduates	Master of Computer Science

**The concept of training**

The educational program is focused on training for research and scientific-technical development in the field of designing and implementation of information systems, which are aimed at solving problems in agriculture and other fields.

**Educational and professional program of master's training**

The object of activity of specialists of this program is the development of algorithms; mathematical modeling; design and development of computer information technologies for data processing and research, use of mathematical statistics apparatus, artificial intelligence, machine learning, modern OLAP and Data Mining, Big Data.

**Areas of employment of graduates**

On their workplaces graduates can address issues related to the management and maintenance of complex information systems. In addition, they can analyze the problem domain at the system level, design and create database and data warehouses, develop applications and software for the implementation of control systems, computer systems, service applications etc. Graduates of this master's program can work at the positions of: computer systems analyst, computer systems engineer, designer of computer systems, software engineers, databases programmer, applications programmer, systems programmer, database administrator etc. Graduates can work in occupations according to the National Classifier of Occupations DK 003: 2010:

213 Calculation Professionals (Computerization)

2131 Professionals in Computer Systems

2131.1 Research assistants (computing systems)

2131.2 Computing system developers

Places of employment: educational institutions; research, design, production, state and private enterprises (specialists of IT departments or IT enterprises).

**Practical training**

Practical training of masters in "Information managing systems and technologies" aims to capture general methodological issues of construction and operation of automated data processing, their development and effectiveness, methods and techniques of construction and maintenance of information management systems in application areas and research.

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### Proposed Topics of qualification Master's Thesis

1. Corporate knowledge database processing on the example of land cadaster: methods and approaches.
2. Geospatial biodiversity assessment system based on fuzzy model.
3. Intelligent classification of crops using satellite data of medium distinction.
4. Farmer's distributed information system.
5. Regression approach in the evaluation of crop acreage.
6. Agricultural monitoring system based on Google Earth technology.
7. The monitoring of crops system using the mobile devices.
8. Information and software decision support system administration in the poultry house.
9. Information and analysis service of decision support in HR management department on the example of universities and its subdivisions.
10. Management Information System of agricultural enterprises with artificial intelligence core.

### Curriculum of Master training in educational program "Information managing systems and technologies" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	About the distribution of mathematical statistics	4	exam
CC 2	Methodology and organization of research on the basics of intellectual property	4	exam
<b>Optional components of EPP</b>			
<b>Optional subjects by Student's Choice</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Modelling and forecast in environmental sphere	5	exam
CC 4	Object modelling and designing of complex systems	4	exam
CC 5	Organization of data warehouse	5	exam
CC 6	Methods of expert systems	4	exam
CC 8	Big Data Technologies	4	exam
CC 9	Data Mining Technology		
CC 10	Work Practice	2	test
CC 11	Research practice	20	test
CC 12	Preparation and defense of Master's qualification thesis	10	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
<i>Optional Block 1 "Computer monitoring environmental and economic processes"</i>			
OC 1.1	Hardware and software for collecting and processing environmental information	4	exam
OC 1.2	Robot-technic Systems of Management	4	exam
OC 1.3	Intellectual environmental monitoring systems	4	exam
<i>Optional Block 2 "Special Information Systems Software"</i>			
OC 2.1	High-performance computer systems	4	exam
OC 2.2	Software for embedded systems	4	exam
OC 2.3	Principles of distributed and network programming	4	exam
OC 2.4	Programming of Artificial Intelligence Systems	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<i>Optional Block 3 "Internet of Things"</i>			
OC 3.1	Technologies of IOT systems designing	4	exam
OC 3.2	Protocols for data transferring in IOT systems	4	exam
<i>Optional Block 4 "Techniques of information systems development"</i>			
OC 4.1	Development of WEB applications	4	exam
OC 4.2	Patterns of object-oriented design and programming	4	exam
OC 4.3	Information systems management	4	exam
OC 4.4	Safety and reliability of computer systems	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of disciplines in the curriculum

#### GENERAL TRAINING CYCLE

##### **Compulsory components of EPP** About the distribution of mathematical statistics.

Studying the course of mathematical statistics gives future professionals theoretical knowledge and practical skills in the application of mathematical methods for learning the laws of random events, analysis of mass economic, social and information processes. Knowledge of these laws makes it possible to predict the development of processes in any scientific field and make analysis of the results in the agricultural industry and business.

**Methodology and organization of research on the basics of intellectual property.** The organizational structure of the scientific team. Planning of research. Conducting research and experimental design in the research work. Intellectual Property Law as the results of human creativity. Intellectual property. State System of Intellectual Property. The international intellectual property system. Protection of intellectual property. The right to intellectual property as an investment and goods. Valuation of intellectual property. Protection of intellectual property rights.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE

##### **Compulsory components of EPP**

**Modelling and forecast in environmental sphere.** Simulation as the method of scientific knowledge. The use of simulation in the study and design of complex systems. Classification of mathematical models according to the properties of the processes modelled. The order of development of mathematical models in the field of environmental management. The principle of material balance. Probabilistic models of the application processes. Models of data visualization obtained through observation. Linear regression models. Monte Carlo Models. Types and methods of forecasting. Tools for simulation and forecasting. Microsoft Excel and MathCad tools for simulation and forecasting.

**Object modelling and designing of complex systems.** Object-oriented analysis and design. Presentation of subject areas. Iterative software development technology of complex systems. Fundamentals of object-oriented programming. Domain model. Object Model.

**Organization of data warehouse.** Models database. Query language. Physical storage, access methods and query processing. Transaction management, concurrency control and crash recovery. Security database. Parallel and distributed databases. Data warehousing and data mining. Concepts and Data Model OLAP. The structure of OLAP-cube. Deployment Services Analysis Services. Determination submission of data sources in the project services Analysis Services.



**Methods of expert systems** Object-oriented analysis and design. Presentation of subject areas. Iterative software development technology of complex systems. Fundamentals of object-oriented programming. Domain model. Object Model.

**Big Data Technologies.** Big Data technologies let to handle large volumes of information accumulated by organizations and make on its basis more balanced management decisions, better understand the customers and business processes. Introduction to Big Data systems. Description of features of real-time data processing. Corresponding tools usage. The ability to expand knowledge and skills beyond the traditional databases.

**Data Mining Technologies.** Data Mining Technology, Data Mining techniques for classification, regression, associative rules search, clustering tasks solving. Data Mining technique usage while constructing the analytical systems.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1 "Computer monitoring environmental and economic processes"*

**Hardware and software for collecting and processing environmental information** Architecture modern distributed systems of collection and processing. Classification of sensors automatically collect environmental data. Algorithms automatically gathering and initial processing. Real time operating system. Research and programming languages. Local area network. Algorithms analytical data processing subsystem upper level. Drafting the collection and processing of environmental information.

**Robot-technic Systems of Management.** Purpose, classification, and problems of robot control systems. Structure, the basic components of robotic control systems. Intelligent robotic systems. The system of perception and recognition of information. Knowledge management system, problem solving and formation control actions. The system of environmental impact. Principles of robots and robotic systems. System design, manufacturing, robotics control systems. Applications robots and robotic systems in the agro-industrial complex.

**Intellectual environmental monitoring systems.** The purpose of studying the discipline "Intellectual computer monitoring systems" is to format the skills in solving problems that are difficult to formalize. To provide the knowledge on assessing the status and trends in the development of information systems (monitoring); the information technologies for solving management tasks are related to the use of artificial intelligence tools and techniques; the means to develop and to use an intelligent information systems in various applied fields.

##### *Optional Block 2 "Special Information Systems Software"*

**High-performance computer systems.** This discipline has several main subjects, they are: peculiarities of the architecture of high-performance systems, approaches to the construction and use of distributed and multiprocessor systems, the implementation of parallelism in calculations, vector data processing, and the peculiarities of the structure and operation of quantum computers are studied. Also, we considerate some attention to the data security issues and the peculiarities of creating and optimizing software designed to work on high-performance systems.

**Software for embedded systems.** This discipline studies: general principles and technical features of the development of integrated systems for controlling various equipment. In this course we considerate the necessity of information for the construction of microprocessor control systems for specialized equipment. WE also solve some tasks of the complex embedded software creating.

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**Principles of distributed and network programming.** The main aim of this course is the learning of fundamentals of designing distributed program systems (including multi-user information systems) and their implementation through the use of modern software development. Special attention is paid to the role of standards of information sharing, storing and visualization.

**Programming of Artificial Intelligence Systems.** This discipline considers the modern methods and models of artificial intelligence, applicable to the design and implementation of decision support systems, systems for collecting, processing, and analyzing large volumes of heterogeneous information. Also, this discipline implies having Python and R programming languages, at least on an average level, for the implementation of the processor for intelligent analysis and data processing.

*Optional Block 3 "Internet of Things"*

**Technologies of IOT systems designing.** IOT systems general concepts and structure. Methodology of computer IoT systems designing (CS IoT). Levels of IoT design – system, operational, functional, technical. Data operation Conveyor of IoT systems. Standards and technologies. Modern methods and technologies design of hardware and software IoT systems designing.

**Protocols for data transferring in IOT systems.** Data transmission protocols in IoT systems. Design of IoT-systems based on software-defined networks and research of appropriate data transmission protocols. Stack of data transmission protocols, in particular MQTT, CoAP, OpenFlow protocols. Means of automation of configuration and testing of software-defined networks.

*Optional Block 4 "Techniques of information systems development"*

**Development of WEB applications.** Characteristics of Internet services. Roles and responsibilities of clients and servers for various applications in the WWW. Basic protocols necessary for creating and web-work programs, Hypertext Markup Language version 4.01, Cascading Style Sheets version 2.1, the application of internal and external CSS, and browser document model as an example MS IE8, language Java Script: syntactic foundation interaction volume, scripts in external files, the technology of AJAX. Extension Hypertext Markup Language – micro formats. Introduction to language PHP, the skills of designing and programming web applications in PHP.

**Patterns of object-oriented design and programming.** Design patterns that can be implemented in standard object-oriented languages.

**Information systems management.** Using of the Library ITIL, which is developed under a model of quality management information services (Information Technology Service Management – ITSM, IT Service Management). Decisions on management of ICS HP, IBM, Microsoft

**Safety and reliability of computer systems.** Elements of reliability theory. The basic definition of reliability and their contents. Methods of ensuring reliability. Reliability and control devices of computer systems. Information redundancy as a panacea control. Ensuring reliability computing processes.

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**Training of Master of Sciences  
in branch of knowledge "Information technology"  
in specialty 122 "COMPUTER SCIENCE"  
educational program "COMPUTER ECOLOGICAL AND ECONOMIC MONITORING"**

Form of training:	Licensed number of students:
– full-time	15
Duration of Training:	
– full-time educational and professional program	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian
Qualification of graduates	Master of Computer Science

**The concept of training**

Specialists in computer ecological and economic monitoring are professionals in information systems. They can assess the environmental effects of large-scale research, development and technology programs; perform an economic assessment of investment in environmental security projects using computer technology; create and exploit geographic information systems using modern software and hardware; accumulate and process interacting flows of GIS data from various monitoring models.

**Educational and professional program of master's training**

The concept of the master's program consists of trained professionals with the skills of design, development and implementation of information systems for environmental monitoring with the help of modern technology of collaborative development; programming, testing, protection and operation of information systems; use technologies and methods of system analysis and decision-making in the creation of large and complex systems; operation of artificial intelligence and automated software. Graduates of this master's program will be knowledgeable in the methods of previous research of subject area for the construction of ecological-economic models of objects and systems; in the representation and processing of information in the form of environmental and economic systems; in solving environmental and economic problems with the help of special algorithms for the effective decision of problems; in the development and implementation of mechanisms for efficient processing of very large scale databases of the environmental and economic purposes.

**Areas of employment of graduates**

Graduates of master's program can work managers in the field of ecological and economic monitoring; developers of software and hardware for creating ecological and economic models at different levels; database administrators; experts on environmental impact assessment and certification of enterprises of all activities (energy, petroleum, chemical, metallurgy, agriculture, food, etc.). Graduates can work in occupations according to the National Classifier of Occupations DK 003: 2010:

213 Calculation Professionals (Computerization)

2131 Professionals in Computer Systems

2131.1 Research assistants (computing systems)

2131.2 Computing system developers

Places of employment: educational institutions; research, design, production, state and private enterprises (specialists of IT departments or IT enterprises).

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### Practical training

Practical training for masters aimed at learning the basic methods techniques of research production problems according to the educational program "Computer Ecological and Economic Monitoring", to the general issues of construction and operation of monitoring systems according to environmental parameter, to the assess the necessary information systems, to the analytical, optimization and forecasting developments based on information system for monitoring and calculation of the expected economic effects of external factors on the environmental consequences.

### Proposed Topics of Master's qualification Thesis

1. Evaluation of agricultural crops based on ground measurements and statistical approach.
2. Predictive models yield of spring crops based on data fusion techniques.
3. Ensemble approach to classification of land cover.
4. Evaluation acreage of winter wheat based on ground and remote measurements.
5. Evaluation of agricultural risks based on a statistical approach.
6. Drought risk assessment by the largest likelihood.
7. Simulation of humus content in the soil by ground and remote sensing.
8. Evaluation of forest areas based on geospatial intelligence.
9. Models cascade for estimating moisture content in vegetation.
10. The methods of data fusion to assess biodiversity.

### Curriculum of Master's training in educational program "Computer ecological and economic monitoring" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	About the distribution of mathematical statistics mathematical statistics	4	exam
CC 2	Methodology and organization of research on the basics of intellectual property	4	exam
<b>Optional components of EPP</b>			
<i>free choice according to the preferences of students in the list of subjects</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Modelling and forecast in environmental sphere	5	exam
CC 4	RS and technology processing geospatial data	4	exam
CC 5	Hardware and software for collecting and processing environmental information	4	exam
CC 6	Object modelling and designing of complex systems	4	exam
CC 7	Organization of data warehouse	5	exam
CC 8	DataMining Technology	4	exam
CC 9	Work Practice	2	test
CC 10	Research practice	20	test
CC 11	Preparation and defense of Master's qualification thesis	10	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1 "Computer monitoring environmental and economic processes"</i>			
OC 1.1	Intellectual environmental monitoring systems	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 1.2	Robot-technic Systems of Management	4	exam
OC 1.3	IT monitoring of environmental and socio-economic processes	4	exam
OC 1.4	Simulation modeling of environmental processes	4	exam
<i>Optional Block 2 "Special Information Systems Software"</i>			
OC 2.1	High-performance computer systems	4	exam
OC 2.2	Software for embedded systems	4	exam
OC 2.3	Programming of Artificial Intelligence Systems	4	exam
<i>Optional Block 3 "Internet of Things"</i>			
OC 3.1	Technologies of IOT systems designing	4	exam
OC 3.2	Protocols for data transferring in IOT systems	4	exam
<i>Optional Block 4 "Techniques of information systems development"</i>			
OC 4.1	Development of WEB applications	4	exam
OC 4.2	Patterns of object-oriented design and programming	4	exam
OC 4.3	Information systems management	4	exam
OC 4.4	Safety and reliability of computer systems	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

##### About the distribution of mathematical statistics mathematical statistics

Studying the course of mathematical statistics gives future professionals theoretical knowledge and practical skills in the application of mathematical methods for learning the laws of random events, analysis of mass economic, social and information processes. Knowledge of these laws makes it possible to predict the development of processes in any scientific field and make analysis of the results in the agricultural industry and business.

**Methodology and organization of research on the basics of intellectual property.** The organizational structure of the scientific team. Planning of research. Conducting research and experimental design in the research work. Intellectual Property Law as the results of human creativity. Intellectual property. State System of Intellectual Property. The international intellectual property system. Protection of intellectual property. The right to intellectual property as an investment and goods. Valuation of intellectual property. Protection of intellectual property rights.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Modelling and forecast in environmental sphere.** The use of simulation in the study and design of complex systems. Classification of mathematical models according to the properties of the processes modelled. The order of development of mathematical models in the field of environmental management. The principle of material balance. Probabilistic models of the application. Linear regression models. Models Monte Carlo. Types and methods of forecasting. Tools for simulation and prediction.

**RS and technology processing geospatial data.** The general concept of remote sensing. Electromagnetic radiation. Classification of remote sensing methods. Sensory systems and remote sensing sensors. Descramble object characteristics. Getting remote sensing data. Data Formats. Standardization in the field of remote sensing. Preliminary



processing of remote sensing data. Geo-referenced images and transformation. image Classification.

**Hardware and software for collecting and processing environmental information** Architecture modern distributed systems of collection and processing. Classification of sensors automatically collect environmental data. Algorithms automatically gathering and initial processing. Real time operating system. Research and programming languages. Local area network. Algorithms analytical data processing subsystem upper level. Drafting the collection and processing of environmental information.

**Object modelling and designing of complex systems.** Object-oriented analysis and design. Presentation of subject areas. Iterative software development technology of complex systems. Fundamentals of object-oriented programming. Domain model. Object Model.

**Organization of data warehouse.** Models database. Query language. Physical storage, access methods and query processing. Transaction management, concurrency control and crash recovery. Security database. Parallel and distributed databases. Data warehousing and data mining. Concepts and Data Model OLAP. The structure of OLAP-cube. Deployment Services Analysis Services. Determination submission of data sources in the project services Analysis Services.

**Data Mining Technologies.** Data Mining Technology, Data Mining techniques for classification, regression, associative rules search, clustering tasks solving. Data Mining technique usage while constructing the analytical systems.

### **Optional components of EPP** ***Free choice according to specialty***

*Optional Block 1 "Computer monitoring environmental and economic processes"*

**Intellectual environmental monitoring systems.** The purpose of studying the discipline "Intellectual computer monitoring systems" is to format the skills in solving problems that are difficult to formalize. To provide the knowledge on assessing the status and trends in the development of information systems (monitoring); the information technologies for solving management tasks are related to the use of artificial intelligence tools and techniques; the means to develop and to use an intelligent information systems in various applied fields.

**Robot-technic Systems of Management.** Purpose, classification, and problems of robot control systems. Structure, the basic components of robotic control systems. Intelligent robotic systems. The system of perception and recognition of information. Knowledge management system, problem solving and formation control actions. The system of environmental impact. Principles of robots and robotic systems. System design, manufacturing, robotics control systems. Applications robots and robotic systems in the agro-industrial complex.

**IT monitoring of environmental and socio-economic processes.** Objectives, targets, legal and regulatory framework of EE monitoring. Compilation of information model observation. Analysis IT network monitoring. Equipment and operation of information systems for monitoring applications. Software and network tools and platform information technology infrastructure businesses. Geographic information systems and technology monitoring of space distributed objects and processes. Management of monitoring data. IT and GIS of spatial analysis and modeling of performance monitoring of ESEP. Models of the structure and relationship of events and dynamics of ESEP. Bold space-time anomalies of ESEP. Assessment of the object of observation and identification of its information model. Forecasting changes in the state of the object. Standards information interaction systems. Integration of IT monitoring of ESEP.

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**Simulation modeling of environmental processes.** IT simulation. Discrete and continuous random variables in models of ecological processes. Imitation modeling of man-made and natural disasters. The assessment of the genetic inheritance of dominant and recessive traits for future generations of organisms. Modeling language (GPSS, SIMULA).

*Optional Block 2 "Special Information Systems Software"*

**High-performance computer systems.** This discipline has several main subjects, they are: peculiarities of the architecture of high-performance systems, approaches to the construction and use of distributed and multiprocessor systems, the implementation of parallelism in calculations, vector data processing, and the peculiarities of the structure and operation of quantum computers are studied. Also, we consider some attention to the data security issues and the peculiarities of creating and optimizing software designed to work on high-performance systems.

**Software for embedded systems.** This discipline studies: general principles and technical features of the development of integrated systems for controlling various equipment. In this course we consider the necessity of information for the construction of microprocessor control systems for specialized equipment. WE also solve some tasks of the complex embedded software creating.

**Programming of Artificial Intelligence Systems.** This discipline considers the modern methods and models of artificial intelligence, applicable to the design and implementation of decision support systems, systems for collecting, processing, and analyzing large volumes of heterogeneous information. Also, this discipline implies having Python and R programming languages, at least on an average level, for the implementation of the processor for intelligent analysis and data processing.

*Optional Block 3 "Internet of Things"*

**Technologies of IOT systems designing.** IOT systems general concepts and structure. Methodology of computer IoT systems designing (CS IoT). Levels of IoT design – system, operational, functional, technical. Data operation Conveyor of IoT systems. Standards and technologies. Modern methods and technologies design of hardware and software IoT systems designing.

**Protocols for data transferring in IOT systems.** Data transmission protocols in IoT systems. Design of IoT-systems based on software-defined networks and research of appropriate data transmission protocols. Stack of data transmission protocols, in particular MQTT, CoAP, OpenFlow protocols. Means of automation of configuration and testing of software-defined networks.

*Optional Block 4 "Techniques of information systems development"*

**Development of WEB applications.** Characteristics of Internet services. Roles and responsibilities of clients and servers for various applications in the WWW. Basic protocols necessary for creating and web-work programs, Hypertext Markup Language version 4.01, Cascading Style Sheets version 2.1, the application of internal and external CSS, and browser document model as an example MS IE8, language Java Script: syntactic foundation interaction volume, scripts in external files, the technology of AJAX. Extension Hypertext Markup Language – micro formats. Introduction to language PHP, the skills of designing and programming web applications in PHP.

**Patterns of object-oriented design and programming.** Design patterns that can be implemented in standard object-oriented languages.

**Information systems management.** Using of the Library ITIL, which is developed under a model of quality management information services (Information Technology

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Service Management – ITSM, IT Service Management). Decisions on management of ICS HP, IBM, Microsoft

**Safety and reliability of computer systems.** Elements of reliability theory. The basic definition of reliability and their contents. Methods of ensuring reliability. Reliability and control devices of computer systems. Information redundancy as a panacea control. Ensuring reliability computing processes.

**Training of masters of sciences  
in branch of knowledge "Information technologies"  
in specialty 123 " COMPUTER ENGINEERING "  
educational program "COMPUTER SYSTEMS AND NETWORKS"**

Form of Training:	Licensed number of persons:
– Full-time	25
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
in Computer Engineering	Master in Computer Engineering

**The concept of training**

The training of masters in this educational program is aimed at implementing production and technical, technological, organizational and management, design, research and educational activities in the field of the creation and operation of computer systems and networks hardware and software.

**Educational and professional program of masters training**

The purpose of the educational and professional program is to train qualified, competitive specialists for research, design and technological, organizational and management activities in the field of computer systems and networks design and operation. Educational program provides the formation of a future specialist ability to dynamically combine knowledge, skills, communication skills and abilities with autonomous activity and responsibility in solving problems in the field of computer engineering for the development and study of hardware and software for computer systems and networks.

In the field of educational activity, the main goal is to develop future professional in terms of the following skills: world-view orientation and a broad outlook in the social, humanitarian, fundamental and professional fields.

In the field of professional activity, the training of masters is associated with acquiring the ability to complete a full range of system work on the development of hardware and software, starting with the conceptual development of the project and its implementation, and ending with user support in the process of already implemented computer system operation.

Training of masters in computer systems and networks in the field of technical means of computer technology allows a professional to design and develop universal and specialized computers at the level of individual units and devices, as well as at the structural and system level microcontroller devices, controllers, adapters, computer networks. In the field of programming and software, the training of masters allows to work as a professional both as a full-stack and a system programmer and to independently develop and use system software and utilities, in particular, to develop and use the drivers, user utilities, operating system components, information systems, databases, computer graphics, automated design systems, interactive systems, artificial intelligence systems, embedded programs for specialized computing systems.

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### Areas of employment of graduates

Graduate can analyze the problem area at the systemic and structural levels of design and resolve the tasks dealing with the development and maintenance of both individual subsystems and the whole complex of universal and specialized computer systems. According to the State Classifier of Professions, graduates of this educational program can work in the following positions: computer systems analyst, computer systems engineer, computer systems designer, computer programmer, system programmer, network administrator, etc.

Future specialists can work in the IT industry by performing the development and maintenance of hardware and software of information security systems, hold primary positions (according to the "State Classifier of Professions"): an analyst of computer systems, an engineer of computer systems, computer systems designer, programmer engineer, system programmer, system administrator, network administrator, etc.

### Practical training

Practical training of students in this specialty is aimed at mastering the main methods of designing, technologies of development and maintenance of hardware and software of specialized computer systems and information security subsystems of such systems.

### Proposed Topics of Master's qualification Thesis

1. Hardware and software means of information protection in computer systems.
2. Specialized function-oriented computer system for specific problems resolving in a particular problem domain.
3. Development of system software of computer systems.
4. Development of hardware and software facilities for information protection in computer networks.
5. Intelligent computer system for the environment state control.
6. Microcontroller system for agricultural objects monitoring and control.
7. Specialized control system for technological processes of agro-industrial enterprise control.
8. Development of network applications for specialized computer systems.
9. Research on the access control computer system to the room based on microcontrollers.
10. Research on face recognition system using computer vision based on IP-camera.

### Curriculum of Master's training in educational program "Computer systems and networks" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC1	Foreign language (for professional purposes)	4	exam
CC2	Research methodology with the basics of intellectual property	4	exam
<b>Optional components of EPP</b>			
<i>free choice according to the preferences of students in the list of subjects</i>			
OCP 1	Optional subject 1	4	test

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**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC3	Theory and design of computer systems and networks	4	exam
CC4	Computer systems programming technologies	4	exam
CC5	Information protection in computer systems and cyber security	10	exam
CC6	Visualization and pattern recognition systems	4	exam
CC7	Intellectual data analysis	4	exam
CC8	Internship	2	credit
CC9	Research practice	20	credit
CC10	Preparation and defense of Master's qualification Thesis	10	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
<i>Optional Block 1 " Internet of Things "</i>			
OC 1.1	Robotic operating systems	4	exam
OC 1.2	Technologies of the IOT systems designing	4	exam
OC 1.3	Data transmission protocols of the IOT systems	4	exam
OC 1.4	Information technologies for monitoring and simulation of the environment	4	exam
OC 1.5	Computer systems of artificial intelligence	4	exam
<i>Optional Block 2 " Computer systems and networks protection technologies "</i>			
OC 2.1	Administration and protection of databases and data warehouses	4	exam
OC 2.2	Computer methods of analysis and design of information security electronic means	4	exam
OC 2.3	Complex systems for authorized access to information	4	exam
OC 2.4	Technologies of administration and operation of protected information and communication systems	4	exam
OC 2.5	Artificial intelligence systems in the tasks of information protection	4	exam
<i>Optional Block 3 "Computer Systems Software"</i>			
OC 3.1	Methods of expert systems construction	4	exam
OC 3.2	Web Application Development	4	exam
OC 3.3	Hardware and software tools for ecological information collection and processing	4	exam
OC 3.4	Intelligent environmental monitoring systems	4	exam
OC 3.5	Robotic control systems	4	exam
OC 3.6	Management of information services	4	exam
OC 3.7	Programming of Artificial Intelligence Systems.	4	exam
OC 3.8	High-performance computer systems	4	exam
OC 3.9	Digital signal and image processing	4	exam
OC 3.10	Embedded systems Software	4	exam
<i>Optional Block 4 "Data Analysis in Computer Systems"</i>			
OC 4.1	Modeling and forecasting in the field of nature management	4	exam
OC 4.2	Big Data technologies	4	exam
OC 4.3	Data Mining Technologies	4	exam
OC 4.4	Modeling with R	4	exam
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

## Annotations of subjects in the curriculum

### GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Foreign language (for professional purposes).** Foreign language scientific text. Formulation and generalization of scientific tasks. Translation and generalization of the main results of observation or experiment. Genres of foreign language scientific text. Terminological glossary by profession. Preparation of annotation for a master's thesis in a foreign language. Annotation composition, lexical and phraseological clichés, grammatical register of annotation. Types of annotations. Culture of foreign language professional communication. Presentation and exchange of scientific information. Discussion of professional and academic issues. Work with professional literature and documentation.

**Research methodology with the basics of intellectual property.** Organizational structure of the scientific team. Planning of the research. Research conduction and experimental design in the research work. Intellectual Property Law as the results of human creativity. Intellectual property. State System of Intellectual Property. The international intellectual property system. The right of intellectual property as an investment and goods. Evaluation of intellectual property. Protection of intellectual property rights.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components of EPP

**Theory and design of computer systems.** System and functional design of computer systems (CS). Technical design of the CS. Methods and algorithms of routing in the CS. Designing of hardware, analysis, justification and choice of CS main components. Designing of I/O subsystems. Converters of information in computer systems. Designing of real-time CS software. Methods of structural analysis and synthesis of computer networks (CN) in real-time CS. Methodology of CN designing. Organization of information exchange in the CS. Processes planning. Simulation of real-time computer information systems. Optimization of information flows in the CN.

**Computer systems programming technologies.** Fundamental concepts of programming technology. Software Development Life Cycle Standards. Programming methods. Modern software development models. Software design tools. Variety of environments to solve the problems of software components interaction. Methods of specification of programs, interfaces and systems. Object-Oriented Visual Programming. Data classes. CASE-tools for the structured approach to software design support. The technology of the implementation of CASE-tools. Data abstraction tools. Classes that depend on the state. Classes that hide algorithms. User interface classes.

**Information protection in computer systems and cyber security.** Fundamentals of information protection. The task of information protection. The procedure of work on information protection carrying out. Classification of methods and means of information protection. Channels of unauthorized information obtainment. The notion of unauthorized information obtainment channel. The methods of information identification. Interception of information in communication lines. Methods of information destruction. Software methods of information destruction. Technical methods and means of information protection. Cryptographic protection of information. Software information protection methods.

**Visualization and pattern recognition systems.** Visualization system (VS) conceptual model. General principles of image synthesis in computer systems, hardware and software visualization systems. High-level language instrumental means for displaying images and graphical objects basic classes. Classification systems and features of image input and imaging tools. Graphical Data Descriptive Standards. Coordinate systems

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conveyor of VS. Geometrical models and transformations, algorithmic and instrumental means of 3D graphic. Principles of working with color images. Basic concepts of the pattern recognition theory. Conveyor of pattern recognition systems. Image enhancement tasks and corresponding features, image filtering. Binarization and image preparation problems. Methods of pattern recognition.

**Intellectual data analysis.** Fundamentals of data mining. Methods of initial data processing. Data structure research methods: visualization and automatic data grouping. The tasks of decision support systems. Databases. OLTP systems for data analysis. Concepts and organization of data warehousing. Correlation and regression analysis of data. Multiple regression analysis. Cluster analysis. Hierarchical and sectional clustering. Methods of clusterization. Raster clustering of objects. Linear discriminatory analysis. Construction of canonical and classification functions. Methods of forecasting.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### ***Optional Block 1 «Internet of Things»***

**Robotic operating systems.** Basic concepts and designations of robotic operating systems (ROS). ROS architecture. Standard and specialized ROS functions. Standard ROS services. User Packages ROS-pkg.

**Technologies of the IOT systems designing.** IOT systems general concepts and structure. Methodology of computer IoT systems designing (CS IoT). Levels of the IoT design – system, operational, functional, technical. Data operation Conveyor of the IoT systems. Standards and technologies. Modern methods and technologies of hardware and software tools of the IoT systems designing.

**Data transmission protocols of the IOT systems.** Designing of the IoT-systems based on software-defined networks and study of appropriate data transmission protocols. Stack of data transmission protocols, e.g., MQTT, CoAP, OpenFlow protocols. Tools for automation of configuration and testing of software-defined networks.

**Information technologies for monitoring and simulation of the environment.** Tasks of ecological monitoring information systems. Classification of monitoring systems. Types of environmental observations and research. Analytical and statistical methods of monitoring results analysis. The concept of a mathematical model. Fundamental principles and techniques of mathematical modelling. Technology of mathematical modelling. Population models. Statistical modelling in ecology. Regression models. Smallest squares method. Composite method of ecosystem modelling. Approaches to mathematical modelling of urban ecosystems. Development and study of mathematical models of biotechnical and agricultural production objects on the basis of computer technologies.

**Computer systems of artificial intelligence.** The concept of artificial intelligence. The concept of smart and intelligent problem. Methods of intellectual tasks representation and methods of search for a solution. Knowledge and knowledge representation models in systems of artificial intelligence (SAI). Semantic grids (SG): basic concepts, types, methods, of description and inference to the SG. Frames: basic concepts, frame structure. Frame systems. Expert Systems (EC): purpose and principles of the construction; generalized architecture, classes of problems that are solved by EC. Modern software tools and instruments for SAI creation: Visual Prolog. Allegro CLOS, CLIPS, JESS. Introduction to functional and logic programming.

##### ***Optional Block 2 «Computer systems and networks protection technologies»***

**Administration and protection of databases and data warehouses.** Administration technologies and exploitation of protected information-communication systems, oriented on distributed data processing. Organization of databases and

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warehouses. Database administration functions. Secrecy provision. Data integrity protection. Protection against unauthorized access. Database recovery.

**Computer methods of analysis and design of information security electronic means.** Methods and technologies of automated designing and study of electronic means and information security systems. Technical means and equipment for unauthorized access to information. Ways of development of means and methods for information obtainment. Classification of technical means of information exchange. Technical methods and means of information protection.

**Complex systems for authorized access to information.** Protection against unauthorized access. Normative legal support for information security. Distribution of security services by levels of ISO/OSI model. Criteria CS protection. Development of security profile. ISO-7498-2 standard. Organization of authorized access at enterprises of any form of ownership. Fundamentals of complex system of authorized access development. Automated access control systems.

**Technologies of administration and operation of protected information and communication systems.** Methods and means of local networks protection when connected to public networks. Types of authentication: static, stable, permanent. Classification of identification and authentication systems. Authentication of users. Symmetric and asymmetric methods for subject authentication. Vulnerabilities of one-time passwords technology. User tools for biometric data. Benefits and methods of biometric identification.

**Artificial intelligence systems in the tasks of information protection.** General theoretical approaches to the ways of intellectualized systems of informational security designing and usage. Knowledge forming and withdrawal. Knowledge representation and the conclusions in the expert systems. Model of knowledge representation by way of first-order logic instruments application. Knowledge representation with productive rules. Forming the concept of artificial intelligence creation in the tasks of information protection. The technology of the expert system development. Fuzzy knowledge representation in the expert systems. Stanford algebra. Dempster-Shafer theory.

#### *Optional Block 3 «Computer Systems Software»*

**Methods of expert systems construction.** Object-oriented analysis and design. Presentation of subject areas. Iterative software development technology of complex systems. Fundamentals of object-oriented programming. Domain model. Object Model.

**Web Applications Development.** Fundamental concepts of end-to-end application creation in the web-environment. The HTML, JAVASCRIPT, PHP languages. Creation of dynamic web-sites. Basic concepts of information and its presentation in web-environment. Principles of databases usage in web-environment, the possibility of web-sites creation by using a variety of software tools and its combinations.

**Hardware and software tools for ecological information collection and processing.** Architecture of modern distributed systems for information collection and processing. Classification of sensors for automatic collection of environmental data. Algorithms for automatic data collection and initial processing. Real time operating system. Research and programming languages. Local computing networks. Algorithms for analytical data processing in upper-level subsystem. Designing the system for ecological information collection and processing.

**Intellectual environmental monitoring systems.** The purpose of studying the discipline is to form the skills in solving the problems that are difficult to formalize. Provide the knowledge on assessing the status and trends in the development of information systems (monitoring); information technologies for managerial tasks solving, related to the

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use of artificial intelligence tools and techniques; the means for intelligent information systems development and usage in various applicability domains.

**Robotic control systems.** Purpose, classification and problems of robot control systems. Structure, basic components of robotic control systems. Intelligent robotic systems. The system of perception and recognition of information. The system of knowledge management, problem solving and management actions formation. The system of environmental impact. The principles of robots and robotic systems construction. System technological design of robotic control systems. Applications of robots and robotic systems in the agro-industrial complex.

**Management of information services.** Organizational structure of the IT service, departments structure, distribution of functions and tasks between the departments. Process approach to IC service management. The ITSM model, developed within the ITIL project (IT Infrastructure Library) and describes the process approach to the provision and support of IT services. Hewlett-Packard Information Systems Management Solutions. ITSM Reference Model. IBM Information Systems Management Solutions. ITPM information process model. Basic IBM / Tivoli technologies. Microsoft's approach to manageable information systems building. Microsoft Solutions for Management - MSM.

**Programming of Artificial Intelligence Systems.** This discipline covers the modern methods and models of artificial intelligence, applicable to the design and implementation of decision support systems, systems for large volumes of heterogeneous information collecting, processing and analysis. Also this discipline implies the knowledge of Python and R programming languages, at least on medium level, – to implement the processors for intellectual analysis and data processing.

**High-performance computer systems.** This discipline has several main subjects: peculiarities of the architecture of high-performance systems, approaches to the construction and use of distributed and multiprocessor systems, implementation of parallelism in calculations, vector data processing, and the peculiarities of the structure and operation of quantum computers are studied. Data security issues are also covered. The peculiarities of software for high-performance systems creation and optimization are also considered.

**Digital signal and image processing.** The main objective of this discipline is to study the modern methods and tools for processing the digital information. In particular, students will learn more about the following: models of signal representation, image sampling methods, reconstruction, transformation, filtering, compression, statistical processing, protection of digital content, fundamentals of spectral analysis, etc. Applied implementations, state and prospects of research in this direction are also studied.

**Embedded systems Software.** Discipline covers the following topics: general principles and technical features of the development of integrated systems for controlling various equipment. In this course we consider the necessary information for the construction of microprocessor control systems for specialized equipment. The task of embedded systems software is complex, requiring the developer to be proficient in various areas of hardware and software engineering.

#### *Optional Block 4 «Data Analysis in Computer Systems»*

**Modeling and forecasting in the field of nature management.** Simulation as the method of scientific knowledge. The use of simulation in the study and design of complex systems. Classification of mathematical models according to the properties of the processes modelled. The order of development of mathematical models in the field of environmental management. The principle of material balance. Probabilistic models of the application processes. Models of data visualization obtained through observation. Linear regression models. Monte Carlo Models. Types and methods of forecasting. Tools for

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simulation and forecasting. Microsoft Excel and MathCad tools for simulation and forecasting.

**Big Data Technologies.** Big Data technologies let to handle large volumes of information accumulated by organizations and make on its basis more balanced management decisions, better understand the customers and business processes. Introduction to Big Data systems. Description of features of real-time data processing. Corresponding tools usage. The ability to expand knowledge and skills beyond the traditional databases.

**Data Mining Technologies.** Data Mining Technology, Data Mining techniques for classification, regression, associative rules search, clustering tasks solving. Data Mining technique usage while constructing the analytical systems.

**Modeling with R.** R language essentials. The R environment. Probability and distributions. Simple linear regression. Residuals and fitted values. Prediction and confidence bands. Correlation. Multiple regression. Model specification and output. Search model. Linear models. Nonlinear curve fitting. Self-starting models.

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## **FACULTY OF HUMANITIES AND PEAGOGY**

**Dean** – PhD in Philosophy, Associate professor I. Savytska

Tel.: (044) 527-80-83

E-mail: pedagogy\_dean@twin.nubip.edu.ua

Location: Academic Building 3, Room 101

The faculty organizes and coordinates the educational and training process for Master of Science students of the following specialties:

### **Speciality 011 “Educational science”**

***Educational program “Information and communication technologies in education”***

Guarantor of the educational and professional program – Associate professor Oleksandr Kuchai, Doctor of Pedagogical Science

***Educational program “Pedagogy of higher school”***

Guarantor of the educational and professional program – Associate professor Lidiia Cherednyk, PhD in Pedagogical

Graduate Department:

**Pedagogy**

Tel: (044) 527-83-55

E-mail: pedagogic@ukr.net

Head of Department – Associate professor Ruslan Sopivnyk, Doctor of Pedagogical Science

### **Specialty 035 “Philology”**

**Specialization 035.041 “Philology (German Languages and Literature) (Including Translation), first – English)”**

***Educational program “English and other foreign language”***

Guarantor of the educational and professional program – Doctor of Philology, Professor M. Lychuk

Graduating Department:

**Romance and Germanic Languages and Translation**

Tel.: (044) 527-68-46

E-mail: krgm@ukr.net

Head of department – Doctor of Philology, Professor M. Lychuk

**Specialization 035.043 “Philology (German Languages and Literature) (Including Translation), first – German)”**

***Educational program “German and other foreign language”***

Guarantor of the educational and professional program – PhD in Philology, Associate professor N. Olkhovska

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Graduating Department:

**Foreign Philology and Translation**

Tel.: (044) 527-80-83

E-mail: kifip@ukr.net

Head of department – Doctor of Pedagogy, Professor S. Amelina

**Specialty 053 “Psychology”**

***Educational program “Psychology”***

Guarantor of the educational and professional program – Shmargun Vitaliy Mykolayovych, Doctor of psychological sciences, professor

Graduating Department:

**Psychology**

Tel.: (044) 527-83-54

E-mail: martirene@nubip.edu.ua

Head of department – PhD in psychology, docent Martyniuk Iryna Anatoliyivna

**Specialty 061 “Journalism”**

***Educational program “Journalism”***

Guarantor of the educational and professional program – doctor of philological sciences, professor Navalna Maryna Ivanivna

Graduating Department:

**Journalism and verbal communication**

Tel.: (044) 527-83-63

E-mail: zhur\_kaf@ukr.net

Head of department – doctor of pedagogical sciences, professor Kostrytsia Nataliia Mykolaivna

**Specialty 073 “Management”**

***Educational program “Human Resources Management”***

Guarantor of educational and professional program is the Candidate of Pedagogical Sciences, Professor Serhii Kubitskyi.

Graduating Department:

**Management and Educational Technologies**

Tel: (044) 527-83-56

E-mail: metod\_dep@nubip.edu.ua

Head of the department – Candidate of Pedagogical Sciences, Professor Serhii Kubitskyi.

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***Educational program "Management of educational institution"***

The guarantor of the educational and professional program is the Candidate of Pedagogical Sciences, Associate Professor Vasyl Bazeliuk.

Graduation Department:

**Management and Educational Technologies**

Tel.: (044) 527-83-56

E-mail: metod\_dep@nubip.edu.ua

The head of the department – Candidate of Pedagogical Sciences, Professor Serhii Kubitskyi.

**Specialty 231 "Social work"**

***Educational Program "Social work"***

Head of educational program – Doctor of Pedagogical Sciences, Associate Professor R. Tarasenko

***Educational Program "Social and psychological rehabilitation"***

Head of educational program – Doctor of Pedagogical Sciences, Associate Professor I. Sopivny.

Graduation department:

**Social Work and Rehabilitation**

Tel.: (044) 527-80-73

E-mail: socpedagogy@ukr.net

Acting Head of the Department Doctor of Pedagogical Sciences, Associate Professor I. Sopivnyk.

**Specialty 291 «International relations, public communications and regional studios»**

***Educational Program «International relations, public communications and regional studios»***

Guarantor of the program – Liliia Makarenko, Doctor of Political Sciences, Associate Professor

Graduating departments:

**International Relations and Social Sciences**

Tel.: (044) 527-81-16

E-mail: kaf\_ist\_pol@ukr.net

Head of Department – Vasyl Strilets, Doctor in History, PhD in Law, Professor

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**Training of masters of sciences  
in branch of knowledge "Education/Pedagogy"  
in speciality 011 "EDUCATIONAL AND PEDAGOGICAL SCIENCES"  
educational program "INFORMATION AND COMMUNICATION  
TECHNOLOGIES IN EDUCATION"**

Form of Training	Licensed number of persons
– Full-time EPP	30
– Part-time EPP	20
Duration of Training:	
– full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian
Qualification of graduates	Master of Education. The specialist in the area of Information and communication technology. Higher education teacher

### **The Concept of Training**

The training of a teacher of a higher education institution is determined by the need of our state for specialists who work to solve applied problems in the field of application of information and communication technologies in education, including the management of information resources, which form the basis of the educational information environment of an educational institution.

### **Areas of employment of graduates**

A graduate with the qualification of “teacher of higher education institutions” can work in the following positions: assistant, teacher in higher education institutions for teaching disciplines with ICT, development of electronic educational materials (technical schools, colleges, higher schools, universities); in scientific, research institutions, methodological centers for the development, implementation and use of information and communication technologies in education; Information Technology Management Expert.

### *Optional Block 1*

The sample block provides for mastering by a future specialist of such a complex of educational disciplines of special (professional) training, as “Pedagogical and psychological foundations of interpersonal interaction in a virtual educational environment”, “Education of the culture of using cyber space”, “Valeokiberetika”, “Psychology of success”.

The purpose of Selective block 1 is to study the pedagogical, psychological, cultural aspects of interpersonal interaction; understanding of the laws, principles, forms, methods and means of instruction in a virtual educational environment, mastery of their content and a system for monitoring and evaluating learning outcomes; improvement, design and modeling of the content of academic disciplines; application of theory and methodology of practical training; planning, organizing the educational process in higher education institutions, fostering a culture of using cyber space.

The academic disciplines of this electoral bloc enable higher education applicants to master the moral and ethical standards of computer ethics: Fundamentals of professional and applied ethics; Computer Ethics: Introduction to the issue; Information Ethics. Ethics

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Internet; Professional ethical norms and rules for “computer professionals”: types of relationships. Legal regulation of the ethics of computer relations Information and legal framework for the regulation of computer relations.

### *Optional Block 2*

The sampling unit provides mastering of a future expert of such a complex academic subjects of special (professional) training, "Measurement in education", "Smart digital technologies in education, Design and examination of the information-educational environment".

The purpose of Selective block 2 is the study of aspects of development theory and teaching methods educational information and communication Sciences; an understanding of the laws, principles, forms, methods and means of teaching, the mastery of the content and system of monitoring and evaluation of results of training; improvement, designing and modelling the educational content of disciplines; applications of theory and technique of practical training; planning, organization of educational process in institutions of higher education.

Of the discipline of this electoral bloc enable applicants to higher education to master the spec tests, quality indicators tests of various types, validity and measurement error. Involves mastering the basics of development and programming devices that operate using smart technologies and Internet technologies. The device information educational technologies are considered as a set of technical, informational and software tools designed to solve a wide range of tasks in various sectors of the economy, education, industry.

Involves the study of the theoretical foundations of design as improving the quality of teaching process (level of organization, the adequacy of methods and means of training, qualification of teachers, and others) Designing open educational technology. Open educational content. Pedagogical design as a science and practical activity. E-learning materials and their characteristics. The structure of the multimedia course. Electronic textbook, Electronic directory, training complex. Electronic laboratory, Computer testing system. A computer model.

### *Optional Block 3*

The sampling unit provides mastering of a future expert of such a complex academic subjects of special (professional) training, as a "Web programming", "Making e-resources training portal, Technology, STEM education, Technology mobile learning".

The purpose of Selective block 3 is the study of information and communication aspects of development of theory and teaching methods of disciplines cycle; understanding of laws, principles, forms, methods and means of creating web projects, e-resources training portal, STEM education and mobile learning, mastery of their content and the system of monitoring and evaluation of results of training; improvement, designing and modelling the educational content of disciplines; applications of theory and technique of practical training; planning, organization of educational process in institutions of higher education by means of ICT.

Of the discipline of this electoral bloc enable applicants to higher education to learn the basics of web design, web layout and web programming to the Internet, theoretical knowledge and practical skills in each of these areas, digital resources in the information society, digital information resources in the field of education, international and national educational resources and personalization of knowledge, technology, the skills needed in the information environment in the General secondary education system. Includes the study of theoretical and practical foundations of STEM education (Science, Technology, Engineering and Mathematics), the approach to the educational process, under which the

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basis of knowledge acquisition is easy and accessible visualization of scientific phenomena that makes it easy to cover and gain knowledge based on practice and deep understanding of the processes.

Involves the study of the essence of mobile learning as e-pedagogy, the role and place of mobile learning technologies in educational process training of masters, distance learning as a kind of m-learning, information educational environment of institutions of higher education.

#### *Optional Block 4*

The sample block provides for the mastery of a future specialist in such a complex of educational disciplines of special (professional) training, such as "Organization of project activities!", "Entrepreneurship", "World economy", "Philosophy of education".

The goal of Selective block 4 is to study the economic aspects of the development of the theory and methods of teaching disciplines; understanding of the laws, principles, forms, methods and training tools, mastery of their content and the system of monitoring and evaluation of learning outcomes; improvement, design and modeling of the content of academic disciplines; application of theory and methodology of practical training; planning, organization of the educational process in higher education institutions.

The academic disciplines of this electoral block enable higher education applicants to form a knowledge system that is related to the design, planning and control of the project, project budget, project risks, project management automation systems, international economic systems, international economic relations, subject and objectives of the philosophy of education.

#### **Practical training**

Practical training is carried out according to the schedule of the educational process directly on the certified practice bases, including: vocational education institutions and higher education institutions (technical schools, colleges, higher schools, institutes).

#### **Curriculum of Master training**

**in educational program "Information and communication technologies in education" (educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Business foreign language	5	exam
CC 2	Head of educational institution	4	test, exam
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Methodology and organization of scientific researches with the basics of intellectual property	4	exam
CC 4	Information technologies in management of educational process	8	term paper, exam
CC 5	Modern programming technologies	8	exam
CC 6	Pedagogy of higher education	9	exam
CC 7	Leadership in education	4	exam

**MASTER CURRICULA AND TRAINING PROGRAMS**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
CC 8	Teaching methods	4	exam
CC 9	Scientific and Industrial Practice	2	
CC 10	Production (assistant) practice	3	
CC 11	Production (undergraduate) practice	5	
CC 12	Preparation of Master's qualification thesis	9	
CC 13	Certification exam	1	
Optional components of EPP			
Free choice according to specialty			
Optional Block 1			
OC 1	Pedagogical and psychological foundations of interpersonal interaction in a virtual learning	4	exam
	Fostering a culture of use of cyber space		
	Valeo Cybernetics		
	The psychology of success		
Optional Block 2			
OC 2	Educational-dimension.	4	exam
	Smart digital technology		
	Design and examination of the information and educational environment		
Optional Block 3			
OC 3	Web programming	4	exam
	The creation of the e-resources		
	Technology STEM education		
	Mobile Learning Technologies		
Optional Block 4			
OC 4	Organization of project activities	4	exam
	Entrepreneurship The essence of entrepreneurship		
	World economy		
	Philosophy of Education		
The total amount of compulsory components		66	
The total amount of optional components		24	
THE TOTAL AMOUNT OF EPP		90	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of EPP**

**Business foreign language.** The formation of knowledge and skills for reading professional and scientific literature, conducting conversations in the “teacher-student”, “supervisor-subordinate”, “subordinate-supervisor” modes, annotating and abstracting the text.

**Head of educational institution.** The constituent documents of the educational institution, state regulation of the activities of educational institutions, the system of normative documents in the field of education, legislative and regulatory acts of the labor protection and civil protection management system, the organizational basis of the work of the head of the educational institution, the work of the administrative service of educational institutions, disciplinary relations management, institution management technologies.

**SPECIAL (PROFESSIONAL) TRAINING CYCLE**  
**Compulsory components of EPP**

**Methodology and organization of scientific researches with the basics of intellectual property** Pedagogical research, methods of research, organization of

research, processing of results of research, pedagogical experiment.

**Information technologies in management of educational process** and the role and Place of information technologies in management of educational process, organizational bases of application of information technology in the management of the educational process, building an information system for the management of educational process

**Modern programming technologies** a Systematic exposition of modern software engineering. Focuses on the organization and management of software systems development, methods for assessing quality and reliability assurance programs. The main task - to teach students methods of analysis, design, implementation, testing, and managing the development of complex programs, to acquaint them with existing software engineering standards and development tools.

**Pedagogy of higher education.** Examines the theory and practice of organization (didactics), education and educational management in institutions of higher education.

**Leadership in education.** The aim of the discipline "Leadership in education" is to provide students with knowledge about the essentiality of leadership origins theory, its types, styles of leader behavior, means of person's leadership qualities realization, secrets of getting success, examples of success in business, agroindustrial complex, scientific life, art, sport, IT-sphere. Discipline includes a subject-specific component which allows students: to get knowledge of the leadership qualities self-improvement, means of the influence on the person's behavior and consciousness, skills of group managing, usage of constructive manipulation and how to disable destructive manipulative ways of influence, how to build up well-balanced interpersonal relationship in the group of people.

**Teaching methods.** Acquisition of knowledge and skills in: preparation of educational and methodological support of the educational process; development and use of criteria and tools for evaluating educational outcomes; conducting theoretical and practical training sessions using modern methodological systems, methods, techniques and technologies; organization of independent work, training and production practices, course design and preparation of qualifying works.

### **Optional components of EPP**

#### ***Free choice according to specialty***

##### *Optional Block 1*

**Pedagogical and psychological foundations of interpersonal interaction in a virtual learning** environment, exploring pedagogical aspects of creation of training-methodological support of effective conditions for students basic theoretical knowledge and practical skills, encourage them to seek new professional knowledge and innovative solutions to assigned tasks, including ICT; the ability to deliver a training problem that was stimulated by intellectual activity, analysis and comparison of the known facts, independence of conclusions and generalizations; effective use of computer oriented educational environment of a higher educational institution during the classroom and out of classroom educational activities.

**Fostering a culture of use of cyber space**, exploring the effects of cyber space on the person in the application of information technology two types of dependence on cyber space: Internet addiction (dependence on on-line games, the dependence on information sites, dependence on communication in cyber space, dependence on porn sites) and gambling addiction. Preventive educational technology, aimed at preventing the formation of students' computer addiction, involves: - ensuring the emotional well-being of students.

**Valeo-Cybernetics** examines ethical rules of computer ethics - the basis of professional and applied ethics; Computer ethics: an introduction to the issues; Information

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ethics. Ethics online; Professional ethical standards and rules for "computer professionals": the types of relationships. Legal regulation of the ethics of computer ratio Information and the legal basis for the regulation of computer ratios. Computer crime; Computer crime on the Internet: a legal assessment, the means of their prevention, and prevention; Ethical-legal problems of protection of intellectual property and copyright on the Internet.

**The psychology of success** intended for the formation of ideas and methods to achieve self-realization, self actualization, psychological well-being, personal maturity, awareness of self-image and self-esteem, self-confidence, readiness to goal setting. The success category in psychology. The concept of success in psychology. The phenomenon of success in social Sciences: psychology, philosophy, sociology, pedagogy, etc. the

### *Optional Block 2*

**Educational-dimension.** Theoretical preparation for understanding the features of educational measurements, abilities and skills for their implementation; knowledge system for the development of test tasks and tests, their alignment, scaling, evaluation and use; knowledge of the basics of probability theory and mathematical statistics; general principles for testing statistical hypotheses; the formation of a scientific worldview and methodological culture of an expert in the field of education; mastery of knowledge about the development of intelligence, creative qualities, the ability to research and innovative activities in the field of education. To the subject "Educational Dimensions" includes topics for training experts in the field of education. It is aimed at developing professionally significant qualities of a manager.

**Smart digital technology** in education is to learn the basics of developing and programming devices that work using smart technologies and Internet of things technologies. At the same time, IT devices are considered as a combination of technical, information and software tools designed to solve a wide range of tasks in various sectors of the economy, education, and industry. Fundamentals of Smart Technologies and the Internet of Things Introduction to Smart Technologies: definition, principles, examples. Definition and principles of Smart Technologies. Data, information, knowledge. Smart city. Smart home. Examples of practical implementation of Smart technologies in the network

**Design and examination of the information and educational environment** considers design as an improvement in the quality of the educational process (level of organization, adequacy of teaching methods and means, teachers' qualifications) Design of open educational technologies. Open educational content. Pedagogical design as a science and practice. Electronic educational materials and their features. The structure of the multimedia course. Electronic textbook, Electronic reference book, Training complex. Electronic laboratory workshop, Computer testing system. Computer models. Selective block by choice of specialty

### *Optional Block 3*

**Web programming Web programming** learn the basics of web design, web layout and web programming to the Internet, theoretical knowledge and practical skills in each of these areas. Theoretical foundations programming techniques. Introduction to programming technology. The classical technological processes. Standard technological processes. The main stages of technological approaches. The main technological approaches. Modern programming techniques. Dynamic Link Library (DLL) a dynamic link library. Dynamic Data Exchange (DDE) is a mechanism of interaction between Windows applications and OS/2. The concept of hypertext. and technology and its role in the world wide web. A review of the current standards of web technology. System Internet Protocol.

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The use of web-technologies for creation of modern information systems. The hypertext markup language HTML – based web documents. The structure of an html document.

**The creation of the e-resources** training portal exploring digital resources in the information society, digital information resources in the field of education. The basic definitions. The concept of resource. Resource classification. Digital resources. Classification of digital resources. International and national educational resources and personalization known. Technology the skills. Information environment in the General secondary education system. Stages of creation of digital educational resources. and principles of their use. The forms and means of application of digital educational resources. in education. Design of digital educational resources. A systematic approach to creating and using digital educational resources. A systematic approach to resource providing technologies. . Multimedia educational resources such as network components of the human system.

**Technology STEM education** studying STEM (Science, Technology, Engineering and Mathematics) science, technology, engineering, mathematics. As the approach to the educational process, under which the basis of knowledge acquisition is easy and accessible visualization research revealed that makes it easy to cover and gain knowledge based on practice and deep understanding of the processes. STEM spheres of activity are directions of modern professional activity, more than half of which are related to engineering, the other part - to information-mathematical and scientific-natural activity: aerospace, computer, biomedical, chemical, mechanical engineering, nuclear, energy-oriented ecological, chemical engineering. IT, programming, ecology, agronomy, atmospheric and space research, statistics, etc. STEM - specialists - modern specialists, which include the following: IT specialists, programmers, engineers, specialists in high-tech industries, specialists in bio - and nano - technologies. STEM specialist - a person who carries out innovative activity with a high degree of interdisciplinarity and adaptability. Network as a means of delivering and supporting multimedia resources. Functional structure of the system of development and use of digital educational resources.

**Mobile Learning Technologies.** Studies the essence of mobile learning as a branch of e-pedagogy Mobile learning technologies as a branch of e-pedagogy. The place and role of mobile learning technologies in the organization of the educational process of training masters. Distance learning as a form of m-learning. Information educational environment of higher education institutions. Theoretical aspects of the use of cloud technology. Google Communication Tools.

#### *Optional Block 4*

**Organization of project activities** "studies the organization of design, planning and project control, project budget, project risks, project management automation systems. The main objectives of the discipline "Project management of informatization - to ensure the assimilation of the basic theoretical, methodological and organizational foundations of project management; provide an opportunity to master the methods of project management at all phases of the project life cycle; develop the ability to use the tools of the project management methodology in activities related to the informatization of the economy; to familiarize with the capabilities of the most common project management software in Ukraine and their practical application; to teach students to isolate and analyze various types of computerization projects in order to build effective ways to develop and maintain software.

**Entrepreneurship The essence of entrepreneurship.** The emergence and evolution of the concept of "entrepreneurship". The main functions of entrepreneurship and the comprehensive description of its modern nature. The subject and method of "foundations of entrepreneurial activity." Fundamentals of the emergence and

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development of entrepreneurship. Organization of social production and its structure. The essence and evolution of economic systems. Commodity production is the material basis for the emergence of entrepreneurship. An entrepreneurial idea and a mechanism for its implementation. Entrepreneurial idea. Determination of the advantages of the created enterprise. The technology of establishing your own business. Constituent documents and their Principles of entrepreneurial activity in Ukraine.

**World economy.** Formation of fundamental knowledge among higher education applicants about the features of the functioning of the world economy in the aggregate of all its subsystems and structural elements, objective laws and principles of its modern development, the sectoral and regional structure of the world economy, as well as the key characteristics of its transformations in the context of trans-nationalization and globalization. Mastering the ability to analyze the international market for goods, services and innovations, the global market for international investments and loans, as well as the global financial market and the world labor market; the study of methods and mechanisms for regulating the global economy.

**Philosophy of Education.** The generalization of the knowledge of masters in education at the theoretical and methodological level, as well as their involvement in the philosophical comprehension of the idea of education as a socio cultural phenomenon and the development of their own worldview concept of education; promoting the formation of a high level of competence and culture of university graduates.

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**Training of masters of sciences  
in branch of knowledge "Education/Pedagogy"  
in speciality 011 "EDUCATIONAL AND PEDAGOGICAL SCIENCES"  
in educational program "PEDAGOGY OF HIGHER SCHOOL"**

Form of Training	Licensed number of persons
– Full-time EPP	30
– Part-time EPP	25
Duration of Training:	
– full-time educational and professional program	1 рік і 4 місяці
– Part-time	1 рік і 4 місяці
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian
Qualification of graduates	Master of Education. Higher education teacher

### **The Concept of Training**

The Concept of Training The preparation of the teacher of institution of higher education is due to the need of our country for specialists engaged in work on the organization of educational process, methodical and scientific work in colleges and colleges, conducts various activities that promote the social development of young people studying in institutions of higher education. The purpose of training masters in the educational and professional program - mastering General and professional competences sufficient for the complex solution of problems in vocational teaching and innovative activities of educational institutions; training of teachers of vocational training, mentors of academic groups, business and life coach, able to effectively solve problems of training, education and development, professional formation of the personality of student institutions of higher education in General and agricultural and environmental agencies in particular, and the ability to shape corporate culture, increase professional qualifications, to train the personnel of enterprises, organizations and companies in the agrarian sector of Ukraine's economy. Feature of the program is the focus on scientific research, hands-on educational activities in institutions of higher education in General and agricultural particular and educationnal activities with the staff of enterprises, organizations and institutions in the agricultural sector: the development of pedagogical skills, the development of leadership skills of over professional, soft, social skills (soft skills) necessary for successful professional self-realization, self-empowerment, building a harmonious social relationships and success in professional activities.

### **Areas of employment of graduates**

A graduate with the qualification "teacher of higher education" can work in the following positions: assistant, methodologist, lecturer, teacher-organizer, researcher in the field of education, researcher-consultant (teaching methods), teacher in higher education institutions, vocational and technical educational institutions, institutions of professional higher education in the field of physical, mathematical, technical, biological, agronomic, medical or humanities.

### *Optional Block 1*

The selective unit provides for the future specialist to master such a set of disciplines of special (professional) training as "Electronic pedagogy in the context of digitalization of vocational education", "Smart digital technologies".

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The purpose of the components of free choice of the student of Selective block 1 is mastering of bases of a technique of introduction in system of education of perspective advanced technologies for the organization of modern educational interaction; formation of skills of creation of electronic training courses; awareness of the peculiarities of the organization of the educational process, the role of the tutor and the success factors of e-learning.

The study of disciplines also involves mastering the basics of development and programming of devices, which are considered as a set of technical, informational and software tools designed to solve a wide range of problems in various fields of education, economics, industry and more.

#### *Optional Block 2*

The selective unit provides for the future specialist to master the component of free choice from the proposed disciplines of special (professional) training ("Pedagogy of tolerance", "Pedagogical skills and ethics of a high school teacher").

Mastering the theoretical foundations and practical skills in the disciplines involves mastering the practical principles of solving professional pedagogical problems related to problems of conflict, tolerant consciousness and behavior in a multicultural educational environment based on interdisciplinary scientific knowledge and modern humanitarian technologies; awareness of the content and components of pedagogical skills of a teacher, tolerant professional communication, principles and norms of scientific and pedagogical ethics of a specialist (teacher and head of a higher education institution), creative nature of pedagogical work, requirements for professionally significant qualities of teachers; formation of a humane position in the process of active communication with various subjects of pedagogical activity; mastering the mechanisms of creative self-realization in professional activities and ways of professional self-improvement; mastering the norms and principles of scientific and professional ethics.

#### *Optional Block 3*

The selective unit provides for the future specialist to master the components of such a set of disciplines of special (professional) training as "Methods of work of a group mentor", "Health-preserving technologies in the educational process".

Mastering the disciplines involves solving a number of tasks of fundamental professional training, in particular: the disclosure of modern scientific concepts of health technologies in the educational process of educational institutions, which will contribute to the formation, preservation and strengthening of health of students and teachers; mastering the method of work of the group mentor to create moral, psychological and organizational conditions for self-development of students, the formation of student body, organization and conduct of educational activities.

#### *Optional Block 4*

The selective unit provides for the mastering by a future specialist of components from a complex of educational disciplines of special (professional) training ("Business coaching", "Retrospective analysis of ideas of personality education").

The purpose of studying the educational components of list 4 is to master the basic technologies and tools of business coaching, to get acquainted with the best practices and models of life and business coaching; retrospective analysis and generalization of philosophical, psychological, economic and pedagogical ideas of personality education outlining approaches to improving the educational process, analysis of the theoretical foundations of the formation and development of ideas of personality education.

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### Practical training

Practical training is carried out according to the schedule of the educational process directly on the certified bases of practices, among which: vocational and technical educational institutions, institutions of professional higher education and institutions of higher education. Vocational training provides on the basis of the listed educational institutions: assistant practice, industrial complex practice in the specialty, scientific and pedagogical practice.

### Curriculum of Master training in educational program "Pedagogy of higher education" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
GENERAL TRAINING CYCLE			
Compulsory components of EPP			
CC 1	Business foreign language	5	exam
CC 2	Head of educational institution	4	test, exam
Optional components of EPP			
Free choice according to the preferences of students from the list of disciplines			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
SPECIAL (PROFESSIONAL) TRAINING CYCLE			
Compulsory components of EPP			
CC 3	Pedagogy of high school	10	course robot, exam
CC 4	Fundamentals of scientific research in pedagogy.	4	exam
CC 5	The history of pedagogy and the development of higher education in foreign countries.	6	exam
CC 6	Leadership in education	5	exam
CC 7	Distance education	5	offse
CC 8	Methods of teaching agricultural disciplines	8	exam
CC 9	Practical training	18	
CC 10	Certification exam	1	
Optional components of EPP			
Free choice according to specialty			
Optional Block 1			
OC 1	Electronic pedagogy in the conditions of digitalization	4	offse
	Smart digital technology		
Optional Block 2			
OC 2	Pedagogy of tolerance	4	exam
	Pedagogical excellence and ethics of the teacher of higher education		
Optional Block 3			
OC 3	Methods of work of the group mentor	4	offse
	Health-preserving technologies in the educational process		
Optional Block 4			
OC 4	Business coaching	4	exam
	Retrospective analysis of ideas of personality education		
The total amount of compulsory components		66	
The total amount of optional components		24	
THE TOTAL AMOUNT OF EPP		90	



## Annotations of subjects in the curriculum

### GENERAL TRAINING CYCLE Compulsory components of EPP

**Business foreign language.** The formation of knowledge and skills for reading professional and scientific literature, conducting conversations in the “teacher-student”, “supervisor-subordinate”, “subordinate-supervisor” modes, annotating and abstracting the text.

**Head of educational institution.** The constituent documents of the educational institution, state regulation of the activities of educational institutions, the system of normative documents in the field of education, legislative and regulatory acts of the labor protection and civil protection management system, the organizational basis of the work of the head of the educational institution, the work of the administrative service of educational institutions, disciplinary relations management, institution management technologies

### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Pedagogy of high school.** The questions of theory and practice of the organization of training (didactics), education and management of education in higher education institutions are considered.

**Fundamentals of scientific research in pedagogy.** Pedagogical research, research methods, organization of scientific research, processing of research results, pedagogical experiment.

**The history of pedagogy and the development of higher education in foreign countries.** The development of the theory and practice of upbringing, education and training from ancient times to the present, in different historical periods, in different socioeconomic formations.

**Leadership in education.** The aim of the discipline "Leadership in education" is to provide students with knowledge about the essentiality of leadership origins theory, its types, styles of leader behavior, means of person's leadership qualities realization, secrets of getting success, examples of success in business, agroindustrial complex, scientific life, art, sport, IT-sphere. Discipline includes a subject-specific component which allows students: to get knowledge of the leadership qualities self-improvement, means of the influence on the person's behavior and consciousness, skills of group managing, usage of constructive manipulation and how to disable destructive manipulative ways of influence, how to build up well-balanced interpersonal relationship in the group of people.

**Distance education.** The purpose of the discipline is the theoretical foundations and practical skills of organizing the educational process in distance format, features of distance learning as a kind of m-learning, features of the information educational environment of higher education, theoretical aspects of using cloud technologies, Google communication tools.

**Methods of teaching agricultural disciplines.** Knowledge of discipline is necessary when studying the laws of development and improvement of production in specific enterprises and associations of agricultural production, as well as maximizing profit. The purpose of this discipline is to obtain theoretical knowledge and the acquisition of practical skills on the efficient use of productive resources, the rational organization of labor, and the highly efficient conduct of agricultural business in a competitive market. The issues of the program of the discipline highlight the problems of the development of the agricultural sector of the economy, the form of agricultural enterprises at the present stage, the infrastructure of the agricultural market, the principles of the organization of cooperatives, the ways of rational use of the material and technical base, the progressive

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forms of labor organization and the main directions for their improvement, the basics of agricultural calculation and other.

**Optional components of EPP**  
***Free choice according to specialty***

*Optional Block 1*

**Electronic pedagogy in the conditions of digitalization.** Mastering the method of introduction into the education system of advanced technologies, such as digital, in particular, for the organization of modern educational interaction; formation of skills of creation of electronic training courses; awareness of the peculiarities of the organization of the educational process, the role of the tutor and the success factors of e-learning.

**Smart digital technology.** The study of the discipline involves mastering the basics of development and programming of devices that work with smart technologies and Internet of Things technologies. In this case, IOT devices are considered as a set of hardware, information and software tools designed to solve a wide range of problems in various fields of education, economics, industry and more.

*Optional Block 2*

**Pedagogy of tolerance.** Transmission of theoretical knowledge about the genesis and day-to-day of understanding “tolerance”, its aspect and warehouse, the world of tolerance in the discourse of globalization of the European understanding, the regulatory and legal base in the implementation of processes of ideas about tolerance practical ambushes of the development of professional pedagogical schools, dealing with the problems of confusion, tolerance and behavior in the minds of a multicultural educational medium on the basis of interdisciplinary human scientific knowledge and advanced technologies.

**Pedagogical excellence and ethics of the teacher of higher education.** Mastering the theoretical principles and practical skills of the discipline involves awareness of the content and components of pedagogical skills of the teacher, principles and norms of scientific and pedagogical ethics of the specialist (teacher and head of higher education), creative nature of pedagogical work, requirements for professionally significant qualities of teachers; formation of a humane position in the process of active communication with various subjects of pedagogical activity; mastering the mechanisms of creative self-realization in professional activities and ways of professional self-improvement; mastering the norms and principles of scientific and professional ethics.

*Optional Block 3*

**Methods of work of the group mentor.** Вивчення дисципліни передбачає оволодіння методикою роботи наставника групи щодо створення морально-психологічних і організаційних умов для саморозвитку здобувачів освіти, формування студентського колективу, організації та проведення виховних заходів.

**Health-preserving technologies in the educational process.** The study of the discipline involves solving a number of problems of fundamental professional training, in particular: mastering the system of knowledge about the laws of health education and upbringing; study of technologies, programs, methods, which are aimed at the formation of health competencies, personal qualities that contribute to the preservation and strengthening of personal health, leading a healthy and safe lifestyle.

The purpose of teaching the discipline is to reveal modern scientific concepts of the introduction of health technologies in the educational process of educational institutions,

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which will contribute to the formation, preservation and strengthening of the health of students and teachers.

*Optional Block 4*

**Business coaching.** Provides mastery of basic technologies and tools of business coaching, which will help solve practical problems in the field of psychological and pedagogical support of the individual and organization. Objectives of the course: mastering the knowledge of the psychological patterns of the coach's work to achieve a clear goal in the field of professional activity, personal life or self-development; structuring algorithms for goal setting, decision making, planning or motivation using coaching techniques and technologies; revealing the creative potential of the student to access ideas that open up innovative opportunities.

Introduction to the best practices and models of life and business coaching: coaching a new business; on business transformation; financial coaching in business, development of corporate standards, selection and inheritance of foreign experience; profitable partnership coaching; to build business relationships; marketing coaching; on personnel management; from effective advertising; pricing strategy, etc.

**Retrospective analysis of ideas of personality education.** The purpose of studying the discipline is a retrospective analysis and generalization of philosophical, psychological, economic and pedagogical ideas of personality education and involves penetration into the essence of educational and pedagogical phenomena, outlining approaches to improving the educational process, analysis of theoretical foundations of formation and development of personality education.

**Training of masters of sciences  
in branch of knowledge 03 "Human sciences"  
in specialty 035 «PHILOLOGY»  
specialization 035.041 "Philology (German Languages and Literature)  
(Including Translation), first – English)  
educational program "ENGLISH AND OTHER FOREIGN LANGUAGE"**

Form of Training:	Licensed number of persons:
– Full-time	30
– Part-time	40
Duration of Training:	
– full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS	
– educational and professional program	90
Language of Teaching	Ukrainian, English, German,
Qualification	Master in Philology, philologistresearcher, translator (German/English), teacher of higher educational institution

### **The concept of training**

The training of philologists-researchers, translators and foreign language teachers of higher educational institutions is determined by the state's demand for specialists engaged in translation and interpretation of scientific literature in agrobiolology, environmental protection, economy, engineering and technology, as well as documentation in the field of food quality and safety, exploring contemporary issues of foreign philology and translation, teaching foreign languages at higher educational institutions.

### **Areas of employment of graduates**

The Master of Philology has a sufficient qualification level to work in different professional groups according to the State Classifier of Professions, namely:

2444 philologist, linguist;  
2444.1 philologist-researcher  
231 lecturer at universities and colleges;  
2320 teacher of a professional educational institution, teacher of a secondary educational institution;  
234 specialized schools teacher;  
2444.2 translator  
24316 translator;  
24325 translator of technical literature.

### **Practical Training**

Practical training is an integral part of the educational process and is carried out according to the educational process schedule directly on authorized practice bases, including: institutions and enterprises of agrarian and environmental profiles of all forms of ownership having translation departments; research institutes and laboratories; translation agencies; higher education institutions.

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### Proposed Topics of master's qualification thesis

1. Ukrainian translation of ecological terminology in contemporary English agrarian discourse.
2. Structural and semantic features of elliptical sentences in original fiction and Ukrainian translations.
3. Structural and semantic features of elliptical sentences in original fiction and Ukrainian translations.
4. Onomastic realities as a component of intercultural communication and ways of their reproduction in the Ukrainian language.
5. Lexical and semantic features of translation of popular science texts on plant bioengineering.
6. Complex terminological combinations of agrarian type in English-language scientific and technical discourse and their translation into Ukrainian.
7. Universal translation cursive as a means of optimizing interpretation.

### Curriculum of Master training in educational program "English and Other Foreign Language" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Pedagogy and Psychology of Higher School	4	exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 2	Methods of Teaching Translation at Higher School	4	exam
CC 3	Communication Strategies of the First Foreign Language	8	exam
CC 4	Communication Strategies of the Second Foreign Language	8	exam
CC 5	Translation Theory	6	exam
CC 6	Translation Techniques (the First Foreign Language)	8	exam
CC 7	Translation Techniques (the Second Foreign Language)	8	exam
CC 8	Methodology and Organization of Scientific Research with Fundamentals of Intellectual Property	4	exam
CC 9	Practical training	8	
CC 10	Preparation and defense of master's qualification thesis	8	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
<i>Optional Block 1</i>			
OC 1.1	Head of the Educational Institution	4	exam
OC 1.2	Information Technologies in Translation	4	exam
OC 1.3	Interpretation and Translation of Specialized Texts (Horticulture and Forestry; Ecology and Agronomy; Veterinary Medicine and Animal Science)	8	exam
<i>Optional Block 2</i>			
OC 2.1	Comparative Typology of the First Foreign and Ukrainian Languages	4	exam
OC 2.2	Modern computer translators' tools	4	exam
OC 2.3	Interpretation and Translation of Specialized Texts (Agrarian Law; Quality, Standardization and Certification Of Production; Agricultural Machinery, Agricultural, Mechanization and	8	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
	Electrification)		
<b>The total amount of Compulsory components</b>		<b>66</b>	
<b>The total amount of Optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE

##### Compulsory components of EPP

**Pedagogy and Psychology of Higher School.** Higher school and pedagogy of higher school of Ukraine today. The student and the lecturer as the subjects of pedagogical interaction. Principles of higher school didactics. Organizational forms and methods of teaching. Monitoring and assessing students' knowledge and skills. Organization of education at higher educational institutions. Subject, tasks and methods of psychology of higher school. Age characteristics of students. Psychological foundations of interactive learning. Teaching and learning styles and their correction. Students' learning motivation. Psychological theories for creating effective teaching methods at higher educational institutions.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE

##### Compulsory components of EPP

**Methods of Teaching Translation at Higher School.** Didactic basics of translation. Translator's professional competence. Content of translation training. Teaching translation and training translators at the higher educational institutions of Ukraine. Working out a syllabus in basic foreign languages (department of translation). Organization of students' self-education.

**Communication Strategies of the First Foreign Language.** Basic complex of topics for conversations and communicative situations aimed to improve linguistic, educational, strategic, pragmatic, intercultural and professional competences of students. Translation

**Communication Strategies of the Second Foreign Language.** Basic complex of topics for conversations and communicative situations aimed to improve linguistic, educational, strategic, pragmatic, intercultural and professional competence of students.

**Translation Theory.** Bases of the translation theory. Translation within Interlingua communication. The problem of determining what translation is. Functions of a verbal message. Pragmatic basis of translation. Hermeneutic and normative aspects of translation. Problematic issue of modelling and evaluating quality of translation. Invariant and the translation unit.

**Translation Techniques (the First Foreign Language).** Consecutive interpretation of German texts into Ukrainian, Ukrainian texts into English, translation of excerpts into Ukrainian. Oral and written summarization in Ukrainian and English. Listening and interpretation/translation of authentic text passages.

**Translation Technique (the Second Foreign Language).** Consecutive interpreting a German text into Ukrainian, Ukrainian text into German, translation of excerpts into Ukrainian. Oral and written summarization in Ukrainian and German. Listening and translation/interpretation of authentic text passages.

**Methodology and Organization of Scientific Research with Fundamentals of Intellectual Property.** General description of methodology. Forms and methods of empirical and theoretical knowledge. Methodological principles and concepts. Current



problems of modern methodology of science. The system of organization of scientific and cognitive activity. Basic model of scientific research. Searching and processing scientific information. Methods of preparation and design for publications. Scientific and methodological culture.

**Optional components of EPP**  
***Free choice according to specialty***

*Optional Block 1*

**Head of the Educational Institution.** The organizational principles of the working activity of the head of the educational institution, work of the administrative service of the educational institution, management of disciplinary relations, technologies of managing the institution.

**Information Technologies in Translation.** Information translation environment. The use of information technologies at stages: preparation, understanding, interpretation of the English scientific and technical text, information and reference search, creation of a translation text and selection of translation equivalents, checking the executed translation. Modern systems of machine and automated translation, CAT-systems. Interpretation and Translation of Specialized Texts (Horticulture and Forestry;

**Ecology and Agronomy; Veterinary Medicine and Animal Science.** Consecutive interpretation of German texts on horticulture and forestry, ecology and agronomy, veterinary medicine and animal science. Consecutive interpretation of Ukrainian texts into German, interpreting excerpts into Ukrainian. Oral and written summarization in Ukrainian and German.

*Optional Block 2*

**Comparative Typology of the First Foreign and Ukrainian Languages.** The subject of comparative typology. Types and history of typological research. Methods of typological analysis. Typology of phonetic, lexical, morphological and syntactic systems of compared languages.

**Modern computer translators' tools.** The use of information technologies in translation and interpretation. Using computer-aided translation (CAT), computer-aided interpreting (CAI) and remote simultaneous interpretation (RSI). Management of terminological resources in computer-aided translation systems, which are used to support simultaneous interpretation and computer-aided translation. The study of operations of search, selection, structuring, import, export of terminology, which is organized in the form of specialized terminology databases.

**Interpretation and Translation of Specialized Texts (Agrarian Law; Quality, Standardization and Certification Of Production; Agricultural Machinery, Agricultural Mechanization and Electrification).** Consecutive interpretation of English texts on agrarian law, quality, standardization and certification of production, agricultural machinery, agricultural mechanization and electrification into Ukrainian. Consecutive interpretation of Ukrainian texts into English, interpreting excerpts into Ukrainian. Oral and written summarization in Ukrainian and English.

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**Training of masters of sciences  
in branch of knowledge "Human sciences"  
in specialty 035 "PHILOLOGY "  
Specialization 035.043 "Philology (German Languages and Literature) (Including  
Translation), first – German)  
educational program "GERMAN AND OTHER FOREIGN LANGUAGE"**

Form of Training:	Licensed number of persons:
– Full-time	15
– Part-time	10
Duration of Training	
– full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS	90
Language of Teaching	Ukrainian, German, English
Qualification	Master in Philology, philologistresearcher, translator (German/English), teacher of higher educational institution

### **The concept of training**

The training of philologists-researchers, translators and foreign language teachers of higher educational institutions is determined by the state's demand for specialists engaged in translation and interpretation of scientific literature in agrobiolology, environmental protection, economy, engineering and technology, as well as documentation in the field of food quality and safety, exploring contemporary issues of foreign philology and translation, teaching foreign languages at higher educational institutions.

### **Areas of employment of graduates**

The Master of Philology has a sufficient qualification level to work in different professional groups according to the State Classifier of Professions, namely:

- 2444 philologist, linguist;
- 2444.1 philologist-researcher
- 231 lecturer at universities and colleges;
- 2320 teacher of a professional educational institution, teacher of a secondary educational institution;
- 234 specialized schools teacher;
- 2444.2 translator
- 24316 translator;
- 24325 translator of technical literature.

### **Practical Training**

Practical training is an integral part of the educational process and is carried out according to the educational process schedule directly on authorized practice bases, including: institutions and enterprises of agrarian and environmental profiles of all forms of ownership having translation departments; research institutes and laboratories; translation agencies; higher education institutions.

### **Proposed Topics of master's qualification thesis**

1. Stylistic and cognitive-pragmatic problems of translation of German agrarian
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advertising texts.

2. Reproduction of the linguistic and cultural features of German political discourse in Ukrainian translation.
3. Use of electronic databases in the translation process.
4. Features of translation of linguistic means of informative texts in agrarian sector.
5. German terminological borrowings and their translation into Ukrainian.

**Curriculum of Master training  
in educational program "German and Other Foreign Language"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components EPP</b>			
CC 1	Pedagogy and Psychology of Higher School	4	exam
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components EPP</b>			
CC 2	Methods of Teaching Translation at Higher School	4	exam
CC 3	Communication Strategies of the First Foreign Language	8	exam
CC 4	Communication Strategies of the Second Foreign Language	8	exam
CC 5	Translation Theory	6	exam
CC 6	Translation Techniques (the First Foreign Language)	8	exam
CC 7	Translation Techniques (the Second Foreign Language)	8	exam
CC 8	Methodology and Organization of Scientific Research with Fundamentals of Intellectual Property	4	exam
CC 9	Practical training	8	
CC 10	Preparation and defense of master's qualification thesis	8	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>Optional Block 1</i>			
OC 1.1	Head of the Educational Institution	4	exam
OC 1.2	Information Technologies in Translation	4	exam
OC 1.3	Interpretation and Translation of Specialized Texts (Horticulture and Forestry; Ecology and Agronomy; Veterinary Medicine and Animal Science)	8	exam
<i>Optional Block 2</i>			
OC 2.1	Comparative Typology of the First Foreign and Ukrainian Languages	4	exam
OC 2.2	Modern computer translators' tools	4	exam
OC 2.3	Interpretation and Translation of Specialized Texts (Agrarian Law; Quality, Standardization and Certification Of Production; Agricultural Machinery, Agricultural Mechanization and Electrification)	8	exam
<b>The total amount of Compulsory components</b>		<b>66</b>	
<b>The total amount of Optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum****GENERAL TRAINING CYCLE****Compulsory components of EPP**

**Pedagogy and Psychology of Higher School.** Higher school and pedagogy of higher school of Ukraine today. The student and the lecturer as the subjects of pedagogical interaction. Principles of higher school didactics. Organizational forms and methods of teaching. Monitoring and assessing students' knowledge and skills. Organization of education at higher educational institutions. Subject, tasks and methods of psychology of higher school. Age characteristics of students. Psychological foundations of interactive learning. Teaching and learning styles and their correction. Students' learning motivation. Psychological theories for creating effective teaching methods at higher educational institutions

**SPECIAL (PROFESSIONAL) TRAINING CYCLE****Compulsory components of EPP**

**Methods of Teaching Translation at Higher School.** Didactic basics of translation. Translator's professional competence. Content of translation training. Teaching translation and training translators at the higher educational institutions of Ukraine. Working out a syllabus in basic foreign languages (department of translation). Organization of students' self-education.

**Communication Strategies of the First Foreign Language.** Basic complex of topics for conversations and communicative situations aimed to improve linguistic, educational, strategic, pragmatic, intercultural and professional competences of students. Translation

**Communication Strategies of the Second Foreign Language.** Basic complex of topics for conversations and communicative situations aimed to improve linguistic, educational, strategic, pragmatic, intercultural and professional competence of students.

**Translation Theory.** Bases of the translation theory. Translation within Interlingua communication. The problem of determining what translation is. Functions of a verbal message. Pragmatic basis of translation. Hermeneutic and normative aspects of translation. Problematic issue of modelling and evaluating quality of translation. Invariant and the translation unit.

**Translation Techniques (the First Foreign Language).** Consecutive interpretation of German texts into Ukrainian, Ukrainian texts into English, translation of excerpts into Ukrainian. Oral and written summarization in Ukrainian and English. Listening and interpretation/translation of authentic text passages.

**Translation Technique (the Second Foreign Language).** Consecutive interpreting a German text into Ukrainian, Ukrainian text into German, translation of excerpts into Ukrainian. Oral and written summarization in Ukrainian and German. Listening and translation/interpretation of authentic text passages.

**Methodology and Organization of Scientific Research with Fundamentals of Intellectual Property.** General description of methodology. Forms and methods of empirical and theoretical knowledge. Methodological principles and concepts. Current problems of modern methodology of science. The system of organization of scientific and cognitive activity. Basic model of scientific research. Searching and processing scientific information. Methods of preparation and design for publications. Scientific and methodological culture.

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**Optional components of EPP**  
***Free choice according to specialty***

*Optional Block 1*

**Head of the Educational Institution.** The organizational principles of the working activity of the head of the educational institution, work of the administrative service of the educational institution, management of disciplinary relations, technologies of managing the institution.

**Information Technologies in Translation.** Information translation environment. The use of information technologies at stages: preparation, understanding, interpretation of the English scientific and technical text, information and reference search, creation of a translation text and selection of translation equivalents, checking the executed translation. Modern systems of machine and automated translation, CAT-systems.

**Interpretation and Translation of Specialized Texts (Horticulture and Forestry; Ecology and Agronomy; Veterinary Medicine and Animal Science).** Consecutive interpretation of German texts on horticulture and forestry, ecology and agronomy, veterinary medicine and animal science. Consecutive interpretation of Ukrainian texts into German, interpreting excerpts into Ukrainian. Oral and written summarization in Ukrainian and German.

*Optional Block 2*

**Comparative Typology of the First Foreign and Ukrainian Languages.** The subject of comparative typology. Types and history of typological research. Methods of typological analysis. Typology of phonetic, lexical, morphological and syntactic systems of compared languages.

**Modern computer translators' tools.** The use of information technologies in translation and interpretation. Using computer-aided translation (CAT), computer-aided interpreting (CAI) and remote simultaneous interpretation (RSI). Management of terminological resources in computer-aided translation systems, which are used to support simultaneous interpretation and computer-aided translation. The study of operations of search, selection, structuring, import, export of terminology, which is organized in the form of specialized terminology databases.

**Interpretation and Translation of Specialized Texts (Agrarian Law; Quality, Standardization and Certification Of Production; Agricultural Machinery, Agricultural Mechanization and Electrification).** Consecutive interpretation of German texts on agrarian law, quality, standardization and certification of production, agricultural machinery, agricultural mechanization and electrification into Ukrainian. Consecutive interpretation of Ukrainian texts into German, interpreting excerpts into Ukrainian. Oral and written summarization in Ukrainian and German.

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**Training of masters of sciences  
in branch of knowledge "Social and behavioral sciences"  
in specialty 053 "PSYCHOLOGY"  
educational program "PSYCHOLOGY"**

Form of Training:	Licensed number of persons:
– Full-time EPP	30
– Part-time	40
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of psychology

**The concept of training**

The program is focused on the integration of basic psychological knowledge with access to the applied field of psychology as a science and practice. Its purpose is to develop the ability to solve complex problems and problems of practical psychology, which involves research and / or innovation and is characterized by uncertainty of conditions and requirements.

**Areas of employment of graduates**

Educational institutions of all levels and types, enterprises and organizations, health care institutions, centers of practical psychology, social and psychological services, including the hotline, counseling centers, research institutions.

**Practical training**

The program provides for 2 types of practice, of which 1 – training, 1 production; In total, 15 ECTS credits of the total volume of the program were allocated for practical training, the total duration of practical training was 10 weeks for the entire period of study. Practical training is carried out separately from the fundamental.

**Proposed Topics of master's qualification thesis**

1. Psychosomatic features of children traumatized by war.
2. Features of psychological assistance to internally displaced families of Ukrainians.
3. Psychological conditions for the effectiveness of individual online counseling.
4. Self-design of the future specialist by means of coaching.
5. Features of electoral behavior of student youth.

**Curriculum of Master training  
in educational program "Psychology"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Business Foreign Language	4	exam

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**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
CC 2	Psychology and pedagogy of higher education	4	test
CC 3	Methodology and organization of scientific research with the basics of intellectual sweetness	4	test
<b>Total</b>		<b>12</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Differential psychology	5	exam
CC 5	Ethnopsychology	5	exam
CC 6	Psychological assistance of the individual	6	exam
CC 7	Psychology of stress (with term paper)	6	exam
CC 8	Organizational psychology	6	exam
CC 9	Workshop on psychological counseling and psychotherapy (with term paper)	4	exam
CC 10	Educational (specialty) practice	3	test
CC 11	Production Practice	12	test
CC 12	Qualifying exam	1	
CC 13	Preparation and defense of master's qualification thesis	6	
<b>Total</b>		<b>54</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty</i></b>			
<i>(student choose 1 discipline from optional block)</i>			
<b><i>Optional Block 1</i></b>			
OC 1.1	Psychiatric propaedeutics	8	exam
OC 1.2	Psychological help for the family	8	exam
OC 1.3	Psychology of spirituality	8	exam
OC 1.4	Psychological foundations of coaching	8	exam
OC 1.5	Psychological assessment of staff	8	exam
<b>Total</b>		<b>8</b>	
<b><i>Optional Block 2</i></b>			
OC 2.1	Clinical psychodiagnostics	4	exam
OC 2.2	Psychology of sexuality	4	exam
OC 2.3	Psychology of leadership	4	exam
OC 2.4	Psychology of business communication	4	exam
OC 2.5	Psychology of marketing and advertising	4	exam
<b>Total</b>		<b>4</b>	
<b><i>Optional Block 3</i></b>			
OC 3.1	Special psychology	4	exam
OC 3.2	Child psychotherapy	4	exam
OC 3.3	Telephone counseling	4	exam
OC 3.4	Psychological technologies of business training	4	exam
OC 3.5	Psychological technologies of modeling and monitoring of electoral behavior	4	exam
<b>Total</b>		<b>4</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

## Annotations of subjects in the curriculum

### GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Business Foreign Language.** During its study, students prepare for professional communication in oral and written forms in English. The discipline provides consolidation of the basics of business and scientific and other speech, taking into account the specifics of the vocabulary of the specialty "Psychology". Studying the discipline helps students to master the main categories of phonetic and grammatical series; basic vocabulary and basic models of word formation; to form dialogical and monologue skills of foreign language communication, skills and abilities of independent work on the text during presentations, resumes, participation in business games, conducting interviews discussing practical situations of professional activity of psychologists in dialogues, teaching poster presentations at conferences, writing other business letters and telephone conversations, acquaintance with scientific achievements in the field of psychology, annotation of foreign countries and conclusion of own theses.

**Psychology and pedagogy of higher education.** The purpose of the course: the formation of psychological and pedagogical competencies of undergraduates that contribute to the effective implementation of the tasks of pedagogical activity in higher education institutions. However, students can take part in the course: take a course on psychological and pedagogical aspects of educational activities, tasks of modern higher from the standpoint of competence approach, find out age, gender, sociocultural characteristics of modern students, plan and conduct psychodiagnostic research / examination, interpret its results and, if necessary, to determine the corrective work on the basis of individual characteristics of students.

**Methodology and organization of scientific research with the basics of intellectual property.** The purpose of the discipline - research on the methodology and organization of scientific research, methods of planning and implementation of scientific, methods of search, processing, storage and use of scientific information, development of research programs and schemes, basics of intellectual property law. Objective: to provide in-depth theoretical knowledge and practical skills on the methodology and organization of research and the basics of intellectual property.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components of EPP

**Differential psychology.** The discipline contributes to the systematization of knowledge about individual, typological and group psychological differences of people, the basis of their formation, structure and ways of manifestation; improving the psychological culture of undergraduates, acquainting them with different methods of diagnosing psychological differences of individuals. It provides an understanding of the main experimental models of research in this field of psychology, the causes and patterns of occurrence and formation of individual psychological characteristics. The discipline develops the ability to plan and conduct psychodiagnostic research / examination aimed at identifying individual differences.

**Ethnopsychology.** While studying the discipline, students gain ideas and knowledge about the uniqueness of the manifestation and functioning of the psyche of representatives of different ethnic communities. Course objectives: to ensure the implementation of a systematic approach to the coverage of socio-cultural and psychological aspects of ethnic communities. The subject of the discipline is the socio-psychological features of national and ethnic communities, their impact on individual behavior, as well as socio-psychological processes and features of ethnic development and interethnic communication.

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**Psychological assistance of the individual.** The discipline is interdisciplinary in nature and acquaints students with the socio-cultural and historical context of the emergence of psychological assistance to the individual and society; forms a holistic view of the different types and levels of psychological assistance; promotes the development of their own emotional and semantic problems, mastering the culture of introspection and personal reflection. Acquired knowledge of the course contributes to the formation of a holistic view of the specifics of psychological care as an applied field of psychology and its place in the structure of psychological knowledge, the ability to analyze the basic theoretical constructs of counseling and therapeutic psychology.

**Psychology of stress (with term paper).** The discipline aims to form knowledge about the nature and specifics of stress, phases of its course, mechanisms and methods of preventing and overcoming stress, developing practical skills in diagnosing and correcting psychological stress and the ability to apply knowledge in practice. Its task is to acquaint master students with the phenomenon of stress as an important destabilizing factor in professional activities and personal life, the history of the study of stress, as well as the achievements of modern psychological science on stress, identifying ways to prevent and overcome stress. Discipline is important for mastering the skills of psychological help and self-help in stressful situations.

**Organizational psychology.** The purpose of the discipline is to acquaint students with the psychology of organizations: the essence of the organizational system, features of organizational development, psychological content of organizational management, psychological phenomena that accompany the individual in the organization, features of working groups and teams in organizations, signs of organizational culture. management and business, as well as methods of their research. The discipline also forms knowledge of the essence of psychological care in organizations: methods of psychodiagnostics, technology of organizational counseling, psychological support of organizational training.

**Workshop on psychological counseling and psychotherapy (with term paper).** The discipline is interdisciplinary in nature and is designed to form adequate ideas about the role and place of psychological counseling and psychotherapy in the system of psychological care, the peculiarities of the organization of psychological counseling; types of procedures and psychotechnics in relation to the stages of the psychological counseling process. She develops counseling and psychotherapy skills for clients and their families.

**Educational (specialty) practice.** The purpose of the practice is to deepen students' theoretical knowledge, acquaint them with the necessary requirements for the skills and abilities of future professional activity, the formation of a creative research approach to practical activities. Its tasks are to get acquainted with the legal documentation governing the activities of psychologists on the basis of practice, with the system of interaction of psychologists and other employees of the practice base, with the work of psychologists on the basis of practice, with the peculiarities of the psychologist's work with clients. practices with the professional community. During the internship the analysis of types of requests of clients of the base of practice, methodical support used by psychologists of the base of practice, psychodiagnostic tools used by psychologists on the basis of practice, techniques of psychological assistance used by psychologists of the base of practice, maintenance of reporting documentation by psychologists of the base.

**Industrial (specialty) practice.** The purpose of the practice is to develop and consolidate students' practical skills in planning and implementing the main activities of psychologists: psychodiagnostics, psychocorrection and psychotraining, psychological counseling, psychological education, as well as improving the professional qualities of future professionals. During the internship it is necessary to get acquainted with the legal documentation, which regulates the activities of the psychologist at the place of practice, with the system of interaction between the psychologist and other employees of the practice base. The peculiarities of the work of psychologists on the basis of practice are

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also observed. Applicants perform the functions of a psychologist on the basis of practice, maintain the necessary documentation in the workplace, collect empirical material for qualification work, are supervised by an experienced psychologist from the base of practice.

**Certification exam.** This is an exam in disciplines that are professional in the training of psychologists. It involves testing the ability of applicants to integrate knowledge from different fields of psychology to solve a practical problem in the specialty.

**Defense of qualifying master's thesis.** This is the final form of independent research work of students, which reflects the level of their theoretical and practical, general and professional competencies within the mandatory and elective components of the educational and professional program. It involves the student's independent solution of research problems of a generalized nature.

### **Optional components of EPP** **Free choice according to specialty** *Optional Block 1*

**Psychiatric propaedeutics.** It is important for mastering the skills of providing psychological assistance. During its study students learn the features and patterns of manifestation, course and consequences of mental disorders, their differences from the manifestations of normal mental activity, components of individual psychopathological symptom complexes, patterns of major mental illnesses, and learn ways and methods of clinical detection of mental phenomena. Discipline provides an understanding of the features and patterns of manifestation, course and consequences of mental disorders. It promotes the development of skills to apply acquired knowledge for clinical interviewing and diagnosis.

**Psychological help for the family.** The purpose of the course: the integration of psychological knowledge of students in the field of family psychology to implement them in the practice of psychological assistance to families in solving problems, overcoming family crises, as well as systematization of issues arising in family counseling. By studying the course, students will be able to: comprehend the theoretical aspects of family psychology, form an idea of the phenomenology of normative and non-normative family crises, develop skills in diagnosing the leading problems and characteristics of the family system; to consider the main directions of family counseling, to form psychological readiness to work in the field of psychological counseling.

**Psychology of spirituality.** The aim of the discipline is to form in future scientists theoretical knowledge about spirituality in a psychological context; research of deep questions of the nature of consciousness and behavior of people from complementary points of view; understanding of deep mental processes and their basis; study of basic concepts and research approaches to the interpretation of the spiritual world of man; formation of critical thinking. It acquaints master's students with the general laws and logic of the development of ideas about the spiritual world of man through psychological and religious-philosophical prism in diachronic and synchronous aspects, the originality of interpretation of the phenomenon of human spirituality in the context of psychodynamic and humanistic theories of personality. and their synthesis. The discipline provides students with higher skills of scientific unbiased and objective analysis of mental and spiritual phenomena by developing critical perception and evaluation of different conceptual points of view, the ability to objectively evaluate different approaches to human phenomenon, its spirituality and argue their own worldview.

**Psychological foundations of coaching.** The discipline develops future psychologists' knowledge in the field of coaching to help clients achieve their goals in professional and / or personal life. She acquaints with the psychological basis of coaching as one of the effective ways to achieve positive change, with the uniqueness of this

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method of consulting and training; with the techniques and methods that coaches work with.

**Psychological assessment of staff.** The discipline acquaints with theoretical, methodical and semantic aspects of psychological assessment of staff. It contributes to the formation of a system of knowledge, skills and abilities necessary for the organization of diagnostics in order to assess the staff of the organization. The course provides an opportunity to understand the patterns and features of the development and functioning of mental phenomena in the context of professional tasks, forms the ability to apply knowledge in practical situations.

### *Optional Block 2*

**Clinical psychodiagnostics.** The discipline is designed to form adequate ideas about the role and place of the psychodiagnostic component in the system of clinical psychology, the possibilities and limitations of psychodiagnostic techniques; mastering ethical norms, strict adherence to which is mandatory for the clinical psychodiagnostic; ability to implement in practice the principles and methods of clinical and psychodiagnostic research. Acquired knowledge of the course will guide the practical tasks and functions of a clinical psychologist, identify opportunities, forms and methods of psychodiagnostic work, use the acquired knowledge to analyze and explain the functioning of basic mental functions and physiological systems in normal and pathology, use valid and reliable psychodiagnostic tools for analysis of factors that change the mental qualities of man as a result of the disease (somatic, neurological, mental).

**Psychology of sexuality.** While studying the discipline, students gain ideas and knowledge that exist in the psychological science of sexuality, its development and impact on personal and socio-psychological functioning, acquiring skills in psychocorrection and providing assistance to people with psychosexual disorders. Objectives of the course: to ensure the implementation of a systematic approach to the coverage of socio-cultural and psychological aspects of sexuality, psychological patterns of sexual behavior, equip students with knowledge of age-related sexual behavior, psychology of sexual life, psychology of sexual disorders.

**Psychology of leadership.** The purpose of the course is to form students' scientific and professional knowledge in the field of effective leadership, development of psychological culture of the future leader and development of technologies to create and promote personal brand leader, activation of leadership potential as a set of skills of self-management and management. The discipline forms scientific ideas about the socio-psychological nature of leadership, about modern challenges and requirements for effective leadership; acquaints with the main types of leadership and their manifestations in various spheres of life of the individual and society; expands students' understanding of the leader's own potential for further personal and professional development; develops skills of analytical and critical thinking, the ability to evaluate ideas and proposals, formulate evidence, draw conclusions and summarize arguments, creatively generate new ideas; to form primary skills of creation and advancement of a personal brand of the head.

**Psychology of business communication.** The discipline is aimed at the formation of communicative competence in future psychologists. During its study, undergraduates acquire knowledge about the features of types, forms, methods and technologies of business communication. The study of the discipline promotes the development of skills and abilities in the application of methods and means of business communication in professional activities during business conversations, collective discussion of problems, in public speeches that affect the effectiveness of social relations and interpersonal relationships.

**Psychology of marketing and advertising.** The purpose of the course is to form students' educational and scientific level of competence in determining the psychological

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impact of marketing and advertising on the target audience and the formation of practical skills in applying psychological techniques to influence consumer behavior in the use of various marketing tools. The discipline forms a system of knowledge of psychological theories and methods of influencing various marketing tools, promotes the acquisition of skills to create an advertising message in terms of formal and substantive aspects; mastering the knowledge of the psychological foundations of consumer behavior; develops the ability to carry out psychological and psychotechnical analysis of advertising, to determine the psychological effectiveness of advertising.

### *Optional Block 3*

**Special psychology.** The discipline is designed to help higher education seekers to understand the essence of the practical psychologist by mastering theoretical and practical knowledge in the context of modern achievements of psychological science, psychological patterns of normal and abnormal personality development, driving forces of its development, typological manifestations of various forms of dysontogenesis, developmental disorders and their parents. In the process of studying the discipline, higher education students must understand the psychological aspects of teaching and education in higher education institutions.

**Child psychotherapy.** The discipline is designed to help higher education seekers to understand the essence of the child psychotherapist by acquiring knowledge in the context of modern achievements of child psychotherapy, psychological patterns of normal and abnormal development of the child's psyche, its driving forces and development, typological manifestations of various forms of maladaptation. developmental disorders and their parents. In the process of studying the discipline, higher education students must understand the psychological aspects of the functioning of the child's psyche within the norm and dysfunction. In addition, the discipline promotes the formation of students' abilities for self-esteem, self-control, self-realization, to ensure the development of possible patterns of behavior in situations of professional interaction, to understand the logic of communication management, as well as skills and psychological readiness to form and work in a team.

**Telephone counseling.** Discipline is important for mastering the skills of psychological care. During its study, students learn the theory and practice of providing psychological assistance through telephone communication. The discipline provides an understanding of the features of psychological telephone counseling for different categories of clients. It promotes the development of skills to provide psychological support to emergency customers.

**Psychological technologies of business training.** The purpose of the training course is to provide a system of knowledge and organization of skills acquisition in the organization, conduct and management of business training. Tasks: formation of a holistic concept of the processes of organizing, preparing and conducting business trainings; disclosure of the technology of preparation, organization and conduct of business trainings in their unity and interdependence; identification of the main components of business training technology; providing skills in organizing and conducting specific business trainings in the organization (corporate business trainings).

**Psychological technologies of modeling and monitoring of electoral behavior.** The purpose of the training course is to consider the theories, factors and mechanisms of electoral behavior, to reveal the main technologies of sociological support of election campaigns. The discipline forms a system of knowledge about the basic theoretical approaches to the study of electoral behavior, the electoral process and electoral behavior of the population; helps to master the methods of sociological research of the electorate, the ability to analyze the information of sociological research during election campaigns.

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**Training of masters of sciences  
in branch of knowledge "Journalism"  
in specialty 061 "JOURNALISM"  
educational program "JOURNALISM"**

Form of Training:	Licensed number of persons:
– Full-time EPP	30
– Part-time	30
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	journalist

**The concept of training**

The concept of training is to focus on preparing a specialist to work in modern media and departments that provide informative support. Features of the program are: logical continuation of the educational program of the first (bachelor's level) "Journalism", which is aimed at new media and practice-oriented; taking into account international and European standards of journalistic activity, directives on journalistic ethics and integrity, legal, environmental, managerial components in the media sphere and agribusiness.

**Educational and professional program of master's training**

***Optional Block "Digital media"***

Provides for the acquisition of competencies in digital and network technologies in media, digital media marketing, digital media security.

***Optional Block "Public ecospace"***

Provides for the acquisition of competencies in environmental public relations, environmental safety in media discourse, environmental and legal ethics.

***Optional Block "Information support of agribusiness"***

Provides for the acquisition of competencies in agricultural policy and agribusiness management, media monitoring of the agricultural market, promotional technologies in agribusiness.

**Areas of employment of graduates**

Mass media: editorial offices of newspapers, magazines, TV and radio companies, online publications, press and news agencies, press centers, public relations services, advertising agencies, information departments and administrations of institutions, organizations, enterprises of all forms of ownership.

**Practical training**

Practical training in mass media, press and news agencies, press centers, public relations services, advertising agencies, information departments and administrations of institutions, organizations, enterprises of all forms of ownership.

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### Proposed Topics of master's qualification thesis

1. Agrospace of Ukraine: topics, issues, communicative aspect.
2. Visual and verbal components of television advertising (for example, food advertising).
3. Environmental issues in modern media.
4. Ethical principles of journalistic activity during the election campaign.
5. European print media: problems of existence in the information space.
6. Genre varieties of critical materials in the electronic edition "Media criticism".
7. Appearance of TV presenters: stereotypes and innovations, aesthetic and pragmatic purpose.
8. Communicative components of psychological/information war.
9. Features of PR-support of political activity during elections.
10. Problems and conflict in the journalistic text.

### Curriculum of Master training in educational program "Journalism" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Business foreign language	4	exam
CC 2	Research methodology with the basics of intellectual property	4	exam
CC 3	Organization of project activities	4	exam
<b>Total</b>		<b>12</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Theory of social communications	5	exam
CC 5	Digital culture and media space	5	exam
CC 6	Ecojournalism	7	exam
CC 7	Legal regulation of media business	4	exam
CC 8	Professional ethics and integrity	5	exam
CC 9	Journalistic skills	5	exam
CC 10	Media relations	8	exam
CC 11	Industrial (undergraduate) Practicel	10	exam
CC 12	Preparation and defense of master's qualification thesis	8	exam
<b>Total</b>		<b>55</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
<i>(applicant chooses one block out of three)</i>			
<i>Optional Block 1. "Digital media"</i>			
OC 1.1	Digital and network technologies in media	5	exam
OC 1.2	Digital media marketing	5	exam
OC 1.3	Digital media security	5	exam
<b>Total</b>		<b>15</b>	
<i>Optional Block 2. "Public ecospace"</i>			
OC 2.1	Environmental PR	5	exam
OC 2.2	Environmental safety in media discourse	5	exam
OC 2.3	Environmental and legislative ethics	5	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>Total</b>		<b>15</b>	
<i>Optional Block 3. "Information support of agribusiness"</i>			
OC 3.1	Agricultural policy and agribusiness management	5	exam
OC 3.2	Media monitoring of agricultural market	5	exam
OC 3.3	Promotion technologies in agribusiness	5	exam
<b>Total</b>		<b>15</b>	
<b>The total amount of compulsory components</b>		<b>67</b>	
<b>The total amount of optional components</b>		<b>23</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Business foreign language.** The purpose of the course is learning the basics of business communication orally and in writing in typical situations: introduction, phone conversation, employment, business meeting, business trip, booking tickets and hotel rooms, restaurant, shop, doctor visit, business negotiation skills, discussion, drafting and signing of contracts, commercial correspondence. The basis of educational materials are texts of scientific and business style. The purpose of this course is also to teach students active proficiency in a foreign language, i.e. adequate ability to express their thoughts in a foreign language and understand the views expressed in a foreign language; work independently with a foreign language after graduation.

**Methodology of scientific research with the basics of intellectual property.** The aim of the course is to acquire theoretical knowledge and research methodology, as well as to acquire practical skills in conducting research in the media field. The curriculum provides for the formation of culture and skills of research, implementation of their results in the practice of organizations.

**Organization of project activities.** The purpose of the course is to provide students with competence in the organization of project activities, mastering the skills of practical activities for project management.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Theory of social communications.** The purpose of the course is to present the dynamics of development of social communications and existing approaches, concepts in the field of social communications; provide theoretical knowledge about the document-communication system, models, processes and mechanisms of social communications; to outline the directions and tendencies of development of the document-communication system of the society in the conditions of formation of digital information space.

**Digital culture and media space.** The aim of the course is to analyze modern educational definitions: digital culture, digital literacy and digital competence. Based on the study of domestic and foreign scientific sources, government regulations, these concepts go beyond the technological or digital industry. The main semantic accents of digital culture are related to the emergence of new specific information and virtual forms of culture and cultural communication. Digital literacy indicates, first of all, the perfect use of electronic means, the formation of skills and abilities to work with "digital". The definition of digital competence is based on a general understanding of competence and consists of

relevant knowledge, skills, experience, values and attitudes that can be fully implemented in practice.

**Ecojournalism.** The course provides a broad study of environmental issues of both global and regional importance, the subject area of which is the collection, analysis and dissemination of information related to current events, trends and environmental issues with which people constantly interact.

**Legal regulation of media business.** This course is a review of the legal regulation of the media in Ukraine in order to determine the state of compliance of legislative regulation with the legal nature of the media and business. The theoretical problem of classifying the media as objects or subjects of law is also considered. At the theoretical level, the constituent elements of the average understanding of the media are identified in order to find effective legal regulation of the media and business structures.

**Professional ethics and integrity.** The aim is to form knowledge, skills and competencies in the field of professional ethics and integrity, and to form a conscientious and responsible attitude to learning and the chosen profession. The task of the discipline is to get acquainted with the content and principles of professional ethics, mastering the basics of integrity and its importance for effective work in the Ukrainian and world scientific community. To teach students the basic ethical and professional, norms, principles, rules to ensure further effective professional activity.

**Journalistic skills.** The purpose of the discipline is to form a holistic view of journalistic skills as an activity, mastering the basic laws and methods of journalistic skills. Tasks of the discipline: mastering the mechanisms of skill; outlining the criteria of mastery; mastering the structural and compositional features of the journalistic text; determining the place of professional analysis of a journalistic text; outlining the creative process of a journalist; definition of methods and techniques of journalistic skills; developing skills in working with genres of journalism.

**Media relations.** The course is devoted to the problem of interaction between PR-services and mass media. The significant potential of the institute of public relations to meet the information needs of society can be realized only with the effective interaction of public relations and the media. Media relations, as a promising area of public relations, plays a special role in shaping the image of the organization. This is a professional and regular interaction of PR services with various mass media, namely with journalists, editors, managers and media owners. Establishing communications with the media is the most difficult task in the field of public relations. Building long-term and mutually beneficial relations is an effective contribution of public relations to the development strategy of all spheres of society.

**Practical training.** Practical training involves the acquisition of practical competencies in the media, press and news agencies, press centers, public relations services, advertising agencies, information departments and administrations of institutions, organizations, enterprises of all forms of ownership.

**Preparation and defense of master's qualification work.** Master's thesis is an important type of independent scientific work of students, during the writing of which they master the methods and acquire the skills of scientific research. The student completes his/her master's and scientific training at the university with a master's thesis. It should certify the professional maturity of the graduate, identify his/her general and special training, the ability to apply the knowledge acquired at the university to solve specific scientific and practical problems. The main requirement for students is independent and creative performance of master's theses.

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**Optional components of EPP**  
***Free choice according to specialty***  
*(applicant chooses one block out of three)*  
***Optional Block 1. "Digital media"***

**Digital and network technologies in media.** The course examines the concepts of "network technology", "digital technology", "digital literacy", "computer literacy", "media literacy" and "information literacy". The processes of their formation and formation are generalized, the comparison of these terms, competencies and components (actions) corresponding to certain skills is made, their differences and similarities are revealed.

**Digital media marketing.** The course provides a new concept of digital marketing for domestic marketing practice, which requires scientific generalization of the essence, classification and formation of methodology.

**Digital media security.** The course audits the IT infrastructure of newsrooms to identify potential threats to digital products and services. The course provides recommendations that help reduce digital risks and improve information security, in particular: increase the security of devices and services, accounts of editorial staff; ensure the preservation of information data in case of loss of devices; protect against viruses and spyware; help to achieve anonymity of voice conversations, instant messaging or e-mail.

***Optional Block 2. "Public ecospace"***

**Environmental PR.** With the aggravation of the issue of environmental protection, the number of environmentally conscious consumers around the world has grown rapidly, which has contributed to the emergence of new requirements for the quality of goods and services, the cycle of their production in general. The process of greening business has started the development of "green" PR and has become a new trend among progressive companies seeking to gain a competitive advantage through compliance with relevant environmental requirements. The course considers the concept of ecological public relations and its communication tools, which are aimed at creating competitive advantages through economical treatment of natural resources and their conservation among environmentally conscious consumers.

**Environmental safety in media discourse.** The course involves the identification and assessment of environmental problems, including the impact of war on environmental security in Ukraine: water bodies, air conditions, area conservancy, industrial facilities, etc. The specifics of environmental journalism in the modern world are considered; how to competently cover the environmental problems that have arisen as a result of hostilities; preventive environmental journalism: the role of the media in disaster prevention, solving environmental problems; increasing the efficiency of eco-materials. The sources of information for the preparation of materials from areas affected by hostilities. Are traditional methods effective, like information request, etc.?; preparation of detailed plans of articles/stories, on topics that applicants choose during the press tour and master class.

**Environmental and legislative ethics.** The course examines the problems of legal support of environmental policy of Ukraine, including methodological and legal measures, genesis and mechanism, priority of environmental policy, legal regulation of environmental quality – a strategic direction of environmental policy of Ukraine, as well as legal forms and ways to ensure environmental quality.

***Optional Block 3. "Information support of agribusiness"***

**Agricultural policy and agribusiness management.** A comprehensive course that allows the applicants to gain experience in agriculture, preparing them for a successful career immediately after graduation. The graduates will have the necessary knowledge to take on leadership positions or start their own business.

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**Media monitoring of agricultural market.** The course involves activities to monitor the output of print, online and television media on agriculture. In the commercial sphere, this activity is usually carried out at home or in the media monitoring service, a private company that provides such services to other companies, organizations and individuals on a subscription basis – this process studies the specified course.

**Promotional technologies in agribusiness.** The aim of the course is to form in students a thorough theoretical knowledge and applied skills in the analysis of agribusiness, as well as its promotion in the media. The objectives of the course: formation of a system of knowledge about agribusiness entities, sources of information about agribusiness, resources and results of agricultural producers, balances of agricultural products and food security, gaining skills analysis of resources, results in agribusiness, evaluating their effectiveness and identifying reserves for improvement functioning of the agricultural sector of the economy.

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**Masters training**  
**the field of knowledge «Management and Administration»**  
**speciality 073 «MANAGEMENT»**  
**Educational program "HUMAN RESOURCES MANAGEMENT"**

Form of Training:	Licensed number of persons:
– Full-time	20
– Part-time	30
Duration of Training:	
– full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	HR Manager

**The concept of training**

The training of the HR manager is conditioned by the need of our state in specialists who carry out work on selection, evaluation, training, personnel motivation, career coaching, management of personnel reserve; formation of personnel policy of the company and optimization of its organizational structure; staff records management; development of corporate social responsibility programs, improvement of systems and technologies of personnel management, assessment of socio-economic efficiency of their implementation; labor engineering; carrying out of in-company training, organization of business meetings and conference service.

**Educational and professional training program**

It provides mastering by the future specialist of a complex of educational disciplines on business planning, personnel audit organization, personnel development management, self-management, image studies and social management. The training of a specialist is carried out in the direction of organizing theoretical and practical study with landmarks on the harmonious combination of classroom work of students and direct work at the bases of practical training, which allows the graduate to adapt to the place of future employment.

**Areas of graduates employment**

Graduated students with the qualification of the "HR Manager" can hold the positions of the heads of departments in the field of education and industrial training, personnel and social and labor relations, be the manager or specialist of recruitment agencies, training companies or consulting agencies specializing in work with personnel, public authorities and so on.

**Practical training**

Practical training is carried out in accordance with the academic calendar directly at the certificated practice bases, including Private Joint-Stock Company «Kiev factory of soft drinks «Rosynka», outsourcing company «Sova», recruiting firm «Kariera», Private limited company «ViDi avtostrada», Company «Ukrtelekom», Private Joint-Stock Company «Tsentrahropromyslovykh tekhnolohii», Company «Spetstekhnоекспорт».

**Proposed Topics of master's qualification thesis**

1. Evaluation of the results of professional activity of staff.
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2. Evaluate the effectiveness of personnel services in the health care institution.
3. Personnel management of the health care institution.
4. Management of personnel development of the health care institution.
5. Career management of the company's staff.
6. Management of intellectual capital of the organization.
7. Managing the career growth of staff in the organization.
8. Formation of a system of incentives for personnel of the organization.
9. Formation and organization of personnel policy of the enterprise.
10. Development of the organizational structure of the enterprise.

**Curriculum of Master training  
in educational program "Human Resources Management"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC1	Psychology of management	4	Exam
CC2	Fundamentals of human resources management	4	Exam
CC3	Information systems and technologies in management of the organization	4	Exam
CC4	Business Foreign Language	6	Exam
CC5	Legislative base of labour relations	4	Exam
CC6	Project management	8	
<b>Total</b>		<b>28</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students from the list of disciplines</i>			
OCP 1	Optional subject 1	4	Test
OCP 2	Optional subject 2	4	Test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC7	Business Planning	6	Exam
CC8	Personnel audit	6	Exam
CC9	Management of personnel development	6	Exam
CC10	Team management	4	Exam
CC 11	Practical training	7	Differential test
CC 12	Preparation and defense of master's qualification thesis	9	Defense of work
<b>Total</b>		<b>38</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
OC 1.1	Self-management	4	Exam
OC 1.2	Time-management		
OC 1.3	Organization of work of the manager		
OC 2.1	Modern technology of personnel management	4	Exam
OC 2.2	Image study		
OC 2.3	Social partnership		
OC 3.1	Social management	4	Exam
OC 3.2	Emotion management		
OC 3.3	Business ethics and corporate social responsibility		
OC 4.1	Management of the organization	4	Exam
OC 4.2	Management of the strategic development of the organization		

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 4.3	Changes management		
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Psychology of management.** General psychological characteristics of management activities. The psychological content of management functions. Psychology of business communication. Verbal and nonverbal means of communication. Psychology of the formation of a manager's professional career. Psychology of organization in management. Conflict as a form of social interaction. The essence of the conflict and its characteristics. Dynamics of conflict and forecasting of its development. Conflict Management System in the organization. Conflict resolution methods. Conflict-free communication in the process of conducting professional negotiations and meetings, managing stress in a conflict situation.

**Fundamentals of human resources management.** Personnel service and its role in the management structure of the enterprise. Classification of human resources documents. The specificity of their drafting. Drafting and execution of documents for hiring various categories of workers with different conditions and working pattern. Drafting and execution of documents for transferring to another job both inside the enterprise and beyond. Special aspects of the dismissal of certain categories of workers. Drafting and execution of documents for the employees' dismissal. Accounting of labor hours. Execution of documents for granting various types of vacations to different categories of employees. Drawing up a staff schedule. Application of the classifier of the professions for drawing up staff schedule. Maintenance of employees' work record books.

**Information systems and technologies in personnel management.** Introduction to information systems in the management of organizations. Stages of development and the essence of information systems in the management of the organization. Typology of information systems in the management of organizations. Planning the development of management information systems. Management of information systems in the organization. Management decision support systems. Corporate information systems. Information resources of the Internet world network. Local and regional information networks in modern organizations. Security of information systems. Automated control systems, information processing, and analysis. Information processing technologies. Mathematical and informational support of automated information analysis systems. The use of automated systems for analyzing the activities of the enterprise and making management decisions. Automated systems for planning and analysis of marketing activities.

**Business Foreign Language.** Complex training of language professional activity. Types of language activities: reading, listening, speaking. Formation of skills of dialogical and monologue speech and preparation of students for professional communication in oral and written forms in a foreign language. Mastering the skills of translating special texts as a means of adequately presenting the content of scientific information. Formation of knowledge, skills and competences that will provide the masters with the necessary communication skills in the field of professional communication: in particular, the ability to organize and hold a scientific conference by specialty, participate in the conference and

make a scientific report, hold a business meeting or negotiate with foreign countries partners.

**Legislative base of labor relations.** Social and labor relations as a system. Social partnership. Social and employment relations of employment. Monitoring of the social and labor sphere as a tool for regulation and improvement of social and labor relations. International Labor Organization and its impact on the development of social and labor relations.

**Organization management.** General theory of organization. Organization management. Personnel management. Motivation system. Techniques and methods of staff motivation in management practice. Project-oriented management of the organization.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of EPP**

**Business Planning.** The essence of business planning and the peculiarities of its implementation. Enterprise plan system. The structure and designing of a business plan. Branch, enterprise and its products. Characteristics of the competitive environment. Marketing plan. Production plan. Organizational plan. Analysis of potential risks. Financial plan and evaluation of the effectiveness of the investment project implementation.

**Personnel audit.** Personnel accounting. Personnel department. Local employer documents. Maintaining personnel records at the enterprise. Cases of personnel audit at the enterprise. Stages of an audit of personnel documents. Analysis of typical errors and violations.

**Management of personnel development.** Development of employees as a component of personnel management of the organization. Management of personnel development project. Internal marketing and marketing of organization staff training. Staff development based on its assessment. Training and staff development of the organization. International experience of staff development. Business career management and work with high-potential employees. Fundamentals of social development of personnel. Management of innovations in personnel work. Stimulation of staff development.

**Team management.** Basic stages of team formation. Model of an effective team. Characteristics of the basic rules of the existence of the team. Roles in team interaction. The role and place of effective communication to form a team. Factors of trust and responsibility in teamwork.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Self-management.** Basic principles of the theory of self-management. Laws, principles, synergetic paradigm of self-administration. The phenomenon of self-management. A person as an object of self-administration. A person as a subject of self-administration. Human self-determination. Theoretical and practical principles of person self-management in different types of being. Technological self-management. Fight in self-management.

**Time-management.** The subject and objectives of the "Time-Management course". Time-management analysis in time-management system. Targeting. Time planning. Implementation of plans and organization of activities. Self-control and self-motivation. Increasing time efficiency.

**Organization of work of the manager.** Theoretical bases of organization of management activity. Peculiarities of managerial work. Scientific bases of labor organization. Distribution and cooperation of managerial work. Planning the personal work of a manager. Rationing of managerial work, accounting and analysis of working time. Workplace organization. Working conditions. Documentation in management. Drafting and

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processing of documents. Organization of record keeping. Processing of text materials. Organization and holding conferences and meetings. Business contacts, negotiations, telephone conversations.

**Modern technology of personnel management.** Conceptual principles of personnel management. Modern technologies of team formation and development of personnel of the organization. Technologies for assessing the activities of employees of the organization. Competency-based approach and its use in the management of the personnel of the organization. Management of personnel in crisis: modern technics and technology.

**Image study.** Image as a historical and cultural phenomenon, a component of civilization. Components of the personal image. Gender aspects of the image. Fashion and etiquette in the image structure. Image-strategy of impact on a mass audience. Psychology of perception of image-forming information. The image of the leader. Coaching as a deep tooling for creating an image. Corporate image. The image of the state. The image (style) of life.

**Sociapartnership.** The basic theoretical foundations of social partnership. Social partnership development practice. Social dialogue in the system of labor and social relations. Social partnership and corporate social responsibility. Basic principles of ensuring social partnership in the team. The negotiation process and social responsibility in professional activities.

**Social management.** Management as a modern direction of social management. Evolution of theories and practices of social work management. Social management and social policy. Management of personnel in the social management system. Resource support for social management. Social mechanism and technology of organization management. Manager in the system of social management. Management with Delegation. Communication in management. Organization of management activity.

**Emotion management.** Modern requirements to the manager. The emotional competence of the manager. Emotional intelligence and creating effective teams. Managing emotions when making decisions. Emotions in conflict management. Managing emotions with clients.

**Business ethics and corporate social responsibility.** The concept of business ethics and ethical standards. Business Ethics: Subject and Specificity. Social responsibility in the management system. Social responsibility in the organization management system. Formation of relations with employees on the basis of corporate social responsibility.

**Project management.** Project management in the management system of organizations. Justification of the feasibility of the project and its effectiveness. Organizational structures of project management. Project planning as a component of project management. Planning terms and terms of project implementation. Project resource management. Staffing the project. Project communications and information management. Control of terms and terms of project implementation. Risk management in projects. Project quality management.

**Management of the strategic development of the organization.** The concept of strategic management. Managing the strategic development of the organization. Determining the future of the organization, forming a strategic vision of the direction of development of the organization. Developing a strategy to achieve the desired goals. Assessment of the level of achievement of the set goals.

**Changes management.** The nature, sources and need for change. Classification of organizational changes. Leadership and change leadership. Models of change management. Preparing for and planning changes. The mechanism of change implementation. Change Resistance Management. Traditional and modern methods of change management. Organizational development. Changes in the organization's strategy.

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty 073 "MANAGEMENT"  
educational program "MANAGEMENT OF EDUCATIONAL INSTITUTION"**

Form of Training:	Licensed number of persons:
– Full-time	15
– Part-time	20
Duration of Training:	
– full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master's Degree in Management, head of an enterprise, institution, and organization (in the sphere of education and industrial training)

### **The concept of training**

The training of heads of an enterprise, institution, and organization (in the sphere of education and industrial training) is conditioned by the need of our state for specialists involved in designing and optimizing the education institution's organizational structure; leading its educational and economic activities; controlling the implementation of the planned tasks; developing the education institution personnel policy and the students' contingent.

### **Educational and professional program of training**

Studying the complex of training disciplines on planning and organization issues of an education institution activities (general secondary education institution); leading educational and economic activities of a general secondary education institution; controlling the implementation of the planned tasks; developing the general secondary education institution personnel policy and students' contingent is provided for the future specialists. The training of a specialist is carried out to organize theoretical and practical study with landmarks on the harmonious combination of classroom work with direct work at the bases of practical training, which allows adapting the graduate to the place of future employment.

### **Areas of employment of graduates**

Graduated students with the qualification of the «Head of an enterprise, institution, and organization (in the sphere of education and industrial training)» can work at general secondary education institutions having the following positions: school leaders (head, deputy head), training center leader, out-of-school education institution leader.

### **Practical training**

Practical training is carried out following the training schedule on certified bases of practices: general secondary education institutions, vocational education and training institutions, higher education institutions (colleges, institutes, academies, universities).

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### Proposed Topics of master's qualification thesis

1. Vocational education and training institution management using innovative technologies.
2. Strategy designing for the development of vocational education and training institutions.
3. Content and features of the general secondary education institution management.
4. Developing the corporate culture of the vocational education and training institution's personnel.
5. Developing the managerial culture of the general secondary education institution's leader.
6. Information provision of educational process management in higher education institutions.
7. Secondary school management under the introduction of field-specific education.
8. System approach to the management of innovation activities of research universities.
9. Development of motivation and stimulation of the general secondary education institution's personnel.
10. System of effective personnel management in general secondary education institutions.

### Curriculum of Master training in educational program "Management of educational institution" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Psychology of management	4	Exam
CC 2	Management of educational activity	4	Exam
CC 3	Information and communication technologies in the management of education institutions	4	Exam
CC 4	Business Foreign Language	6	Exam
CC 5	Methodology and organization of research with the basics of intellectual property	4	Exam
CC 6	Strategic management	4	Exam
<b>Total</b>		<b>26</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	Test
OCP 2	Optional subject 2	4	Test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 7	Management of financial and economic activity	7	Exam
CC 8	Personnel management	6	Exam
CC 9	Manager of an education institution	5	Exam
CC 10	Self-management	6	Exam
OK 11	Practical training	7	Differential credit
OK 12	Preparation and defense of master's qualification thesis	9	Defense of work
<b>Total</b>		<b>40</b>	
<b>Optional components of EPP</b>			

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<i>Free choice according to specialty</i>			
OC 1.1	Educational technologies	8	Exam
OC 1.2	Quality management of educational results		
OC 1.3	Management of education institution development		
OC 2.1	Technology of management activity	4	Exam
OC 2.2	Monitoring educational Quality		
OC 2.3	Administrative management		
OC 3.1	Organization of the activities of the general secondary education institutions	4	Exam
OC 3.2	Quality management of the educational process		
OC 3.3	System development of education institution		
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of selective components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components of EPP

**Psychology of management.** Psychology of management as an applied field of psychological knowledge. Psychological patterns of management. Psychological aspects of labor collective management. Personality as a subject of management. Organizational behavior. Psychology of business communication. Empirical studies and techniques in management psychology.

**Management of educational activity.** Regulatory framework of the institution of higher education. Theoretical and methodological principles of educational activity planning at the education institution. Organization and content of the educational activity. Strategic (perspective) and tactical (current) planning and their implementation in the planning documents of the education institution. Planning and organization of educational process at the education institution. Diagnostics and reports on the educational activity of the education institution.

**Information technologies in education and management of education institutions.** Methodology of using the Internet in education institutions. Method of using the MS Office. Methodology of using cloud-oriented services and technologies. Method of using special software.

**Business Foreign Language.** Formation of knowledge and skills in reading professional and scientific literature, conducting conversations in the mode of "supervisor-subordinate", "subordinate-supervisor", abstracting the texts.

**Methodology and organization of research with the basics of intellectual property.** Characteristics of the main legislative and regulatory documents on intellectual property, theoretical and practical problems of the research regulatory organization.

**Strategic management.** Studies the process of environmental assessment, formulation of organizational goals, decision-making aimed at creating and maintaining competitive advantages that can provide business profits in the long run.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Management of financial and economic activity.** Theoretical and methodological principles of management of financial and economic activities of education institutions.

Estimates of the activity of education institution. Mechanisms and technologies for making managerial decisions on issues of financial and economic activities of education institution. Mechanisms and technologies for disposal of property belonging to the institution of property rights, funds within the allocations and income of the institution.

**Personnel management.** Personnel management as a system of measures performed by the personnel services of the organization. Structure of personnel of the organization and personnel records. Staff recruitment and selection. Professional orientation and adaptation of employees. Management of development and movement of personnel of the organization. Formation and preparation of staff reserve. Managing the process of releasing staff of the organization. Assessment of the effectiveness of the personnel service of organization.

**Manager of an education institution.** Professional activity of a specialist. Modeling the professional activity of a specialist. Content of specialist's education. Standards of Education. Social activity of a specialist: the idea, basic concepts. Formation of the content of education: an educational and professional program of specialist training. Structurally logical processing of the array of learning content. Technologies of diagnostics of education quality.

**Self-management.** Basic principles of the theory of self-management. Laws, principles, synergetic paradigm of self-administration. The phenomenon of self-management. A person as an object of self-administration. A person as a subject of self-administration. Human self-determination. Theoretical and practical principles of person self-management in different types of being. Technological self-management. Fight in self-management.

### **Optional components of EPP** ***Free choice according to specialty***

**Educational technologies.** Theory and practice of teaching (didactics) and education. Theoretical foundations of educational technologies, history of educational and technology processes, technology of developmental training, project training, interactive technologies in education, technology of educational activity and development of creative personality.

**Management of the educational process.** Management of education institution. Higher education institutions in the higher education system of Ukraine; quality assurance of higher education; licensing and accreditation; the structure and system of management of higher education institutions; participants in the educational process; formation and movement of students. Organization of educational process in higher education institutions; basic principles of organization of the educational process in HEI; forms of organization of educational process in HEI; forms of training in HEI; control measures in the process of professional training.

**Management of education institution development.** Concepts and modern concepts of management of development of education institution. Basic features of systemic development management. Analysis of internal and external factors of development of education institution. The targeted program is the primary means of systemic development management. Systematic planning of education institution development. System development management of education institution. Effective use of all types of education institution resources. Making optimal decisions regarding the development of the education institution.

**Technology of management activity.** Acquaintance with various forms and methods of building organizational culture, working with people in the management process, promoting the formation of humanistic goals of management.

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**Monitoring the quality of education.** Quality of Education: Common Approaches to Measurement and Management. Monitoring and evaluation of the quality of education. Technologies for measuring and evaluating the quality of education. Methodology of pedagogical measurements: a conceptual apparatus.

**Administrative management.** Criteria for evaluating the activity of the staff, assessing and monitoring the state of performance of the institution's tasks, organizational activity, prospective work plans, types and directions of activity of the education institution, strategy of development of the education institution.

**Organization of the activities of the general secondary educational establishments.** Scientific foundations of general secondary education institution management, education institution management bodies, organization of methodical work, study, generalization and dissemination of advanced pedagogical experience.

**Quality management of the educational process.** Basic approaches to defining the concept of quality of education; the essence of quality management education as a systematic methodology for effective management; basic principles of quality management and features of their application in educational organizations; basic models and methods of quality management education.

**System development of education institution.** System: nature, types and characteristics. Education as a system. The modern higher education system. The pedagogical process as a system. Practical application of the systematic approach in higher education.

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**Training of masters of sciences  
in branch of knowledge "Social Work"  
in specialty 231 "SOCIAL WORK  
educational program "SOCIAL WORK"**

Form of Training:	Licensed number of persons:
– Full-time EPP	15
– Part-time	15
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Manager in the social sphere, teacher of social pedagogy

**The concept of training**

Training of specialists is urgent because our state is currently in need of professionals in the field of social-pedagogical assistance, support, protection and rehabilitation of all categories of children and young people. The professional activity of such specialists involves solving social and pedagogical issues regarding the socialization of children and youth under care, organizing their public protection, consulting on social and pedagogical issues, organizing their leisure activities, assisting in the process of education to those who are directly related to this.

**Areas of employment of graduates**

Our graduates can work in different functional social organizations of various forms of ownership, as well as in educational, cultural, scientific, consulting organizations and institutions; in the subdivisions of the state and municipal departments for family and youth affairs as a pension inspector; researcher (social protection of the population, social sphere); educator and methodologist; teacher of higher educational institution; researcher (in other fields of study); lecturer; state inspector; head of the centers, associations, clubs; director of social services and centers; consultant in specialized services, centers; analyst.

**Practical training**

Practical training is carried out in accordance with the educational process schedule directly at the categorized practical bases, among them: regional centers of social services for family, children and youth; departments for working with street children; educational and recreational complexes; territorial centers of social services; pre-school educational institutions; general secondary schools of I-III degrees.

**Proposed Topics of master's qualification thesis**

1. Features of social and pedagogical work with disabled children.
  2. Features of organizing cultural leisure for adolescents in rural areas.
  3. Preparing young people for family life.
  4. Social work technologies at the centers of social services for children, family and youth.
  5. Social and pedagogical conditions of juvenile convicts' re-socialization at the penitentiary system institutions.
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6. Social and pedagogical work in the sphere of children safeguarding.
7. Social and pedagogical work in the centers of social services for children, family and youth with orphans and children deprived of parental care.
8. Organizational forms of social and pedagogical work with children at risk.
9. Leisure activities for teenagers in recreation centers.
10. Features of communicative activity of social teacher in the process of working with rural youth.

**Curriculum of Master training  
in educational program "Social work"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Foreign language for business communication	4	exam
CC 2	Methodology of scientific research in the social sphere	4	exam
CC 3	Social project management	4	exam
<b>Total</b>		<b>12</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students from the list of disciplines</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Social work in Ukraine	5	exam
CC 4	Management of social institutions	6	exam
CC 5	Higher education pedagogy	6	exam
CC 6	Inclusive pedagogy	5	exam
CC 9	Production Practice	16	test
CC 10	Preparation and defense of master's qualification thesis	12	exam
<b>Total</b>		<b>50</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			
OC 1	Socio-psychological rehabilitation of families	5	test
OC 2	Fundamentals of Physical and Medical Rehabilitation	5	test
OC 3	Internet Marketing in the Social Sector	5	test
OC 4	Advertising and information technologies in the social sphere	5	test
OC 5	Pre-medical training	5	test
OC 6	Social policy	5	test
OC 7	Organization of rehabilitation work with various social groups	5	test
OC 8	Head of educational institution	5	test
<b>Total</b>		<b>40</b>	
<b>The total amount of compulsory components</b>		<b>62</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE  
Compulsory components of EPP**

**Foreign language for business communication.** Development of knowledge and skills necessary for reading professional and scientific literature, conducting a conversation



in the mode of “leader – subordinate”, “subordinate – leader”, making annotations and summarizing texts.

**Methodology and organization of scientific research.** Social and pedagogical research, research methods, organization of scientific research, processing of research results.

**Social project management.** Students study the categorical apparatus of discipline, investigate the stakeholder environment and identify sources and opportunities for project financing, research how to increase the effectiveness of projects, methods and specifics of social project assessment, study to find grant programs, prepare their own project aimed at social problems solution.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of EPP**

**Social work in Ukraine.** Theoretical foundations, content and organization of social work, forms and methods of social work with different categories of clients, ethical principles and ethical norms of behavior of a social worker. Issues of youth social protection and support, pedagogical theory on principles, content, methods, ways and means of social work of social services.

**Management of social systems.** Social and pedagogical features of process management in the system of education, management and communication styles, program of management optimization.

**Higher education pedagogy.** The main problems of higher education pedagogy: features of the educational process, foundations of didactics, technology of the educational process, upbringing, development and socialization of the individual, pedagogical patterns of the educational process.

**Inclusive pedagogy.** Methodological basis of inclusive pedagogy. Features of personality development. Socio-pedagogical activity of a teacher in the context of inclusive education. The theory of inclusive education, training and education. General provisions of inclusive pedagogy. Methodological basis of inclusive pedagogy. The theory of inclusive education, training and education.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Social and psychological rehabilitation of families.** The main directions and forms of social and psychological rehabilitation of families. Methodology for the preparation and implementation of the main forms of social and psychological rehabilitation of families. Social and psychological rehabilitation programs as a form of social work with various types of families. Features of the social rehabilitation of families in the LSS. Characteristics of the activities of the Rehabilitation Centers for families. Features of social and psychological rehabilitation of families raising children with disabilities. Modern programs and projects of social and psychological rehabilitation of families suffering from various types of addictions. Social rehabilitation of families in which the violence was carried out. Socio-psychological rehabilitation of families of ATO/OS. Characteristics of the social and psychological rehabilitation of internally displaced families. Forms and methods of social and psychological rehabilitation of various types of families. A multidisciplinary approach in the implementation of the social and psychological rehabilitation of families. Characteristics of the techniques of social and psychological rehabilitation of families. Social and psychological rehabilitation of HIV-infected and their families

**Fundamentals of Physical and Medical Rehabilitation.** Theoretical and legal foundations of physical and medical rehabilitation. General characteristics of therapeutic physical factors and the principles of physiotherapy. Massage as a method of physical

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rehabilitation for clients. The basics of therapeutic massage. Alternative (alternative) medicine in the treatment and rehabilitation of patients / clients. Spa treatment as a remedy for chronic diseases of internal organs and rehabilitation of persons with disabilities. General issues of medical and physical rehabilitation of children with disabilities. Medical rehabilitation of children with cerebral palsy (cerebral palsy) and children with autism spectrum disorders (ASD). Recovery technologies for injuries and injuries of the musculoskeletal system (ODA) and systemic lesions of the visual and musculoskeletal systems. Technologies for medical and physical rehabilitation of patients / clients with therapeutic problems. Medical and psychological rehabilitation for post-traumatic stress disorder (PTSD) of the military and survivors of emergencies, violence, road accidents.

**Internet marketing in the social sector.** Genesis "SMM". The structure of internet marketing. The history of the formation and development of Internet marketing. The essence and benefits of Internet marketing in the social sphere. Internet marketing environment of the social sphere. Social networks: from inception to the present. Online marketing of quality services in social networks. Promotion of services in social networks. Components of social institution reputation management. Target audience: interaction with a social organization. Approaches to choosing a social network. Motivating clients / institutions. Key values for customers. Community content plan. Promotion of social services on the network.

**Pre-medical training.** Organization of medical care for the population. The subject and objectives of pre-medical training. The concept of a human emergency. General principles and legal framework for the provision of pre-medical care. The concept of clinical protocols and standards for emergency medical care. Personal safety of persons providing pre-medical care. Asepsis, antiseptics. Examination of the victim at the scene. Premedical care in case of shock and terminal conditions with the basics of resuscitation. Premedical care for coma, acute coronary syndrome (myocardial infarction), stroke and epilepsy. Emergencies in the clinic of internal medicine. Medical manipulation technology. The concept of bleeding and blood loss. Control of bleeding. Classification of wounds. Features of pre-medical care for psychogenic disorders in victims. Features of pre-medical care for persons with disabilities. Premedical care for head and neck injuries. Pain control. Traumatic shock. Premedical care for airway obstruction and chest injuries. The concept of pneumothorax. Premedical assistance in extreme situations with traumatic injuries of the abdomen, pelvis, spine. Premedical assistance for limb injuries, wounds, fractures, dislocations, sprains. Immobilization for limb injuries. Prolonged compression syndrome. Premedical care for exposure to extreme temperatures (burns, overheating, hypothermia, frostbite). Premedical care for poisoning and bites of animals and poisonous insects. Premedical assistance in case of electric shock, lightning, drowning, falling from a height. Fundamentals of Infectology and Epidemiology.

**Social policy.** Social policy as a public phenomenon. Goal and tasks of the social policy. Conditions of social policy implementation.

**Organization of rehabilitation work with various social groups.** State standard of social services for social and psychological rehabilitation. Preparation, collection and compilation of information on social and rehabilitation services. Organization of work on the formation of social responsibility of rural youth. Street work with teenagers and young people. Social and psychological rehabilitation of people with HIV / AIDS. Socio-psychological work with families of internally displaced persons. Social work with unemployed people. Socio-psychological work with people prone to suicide. Social work with children with psychopathological behavior. Socio-psychological rehabilitation of persons subjected to violence. Organization of work with people who abuse alcohol.

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Organization of work with people who use psychoactive substances. Social work with teenagers addicted to online games and social networks.

**Head of the educational institution.** Legal basis for the implementation of managerial functions in an educational institution. The influence of the processes of European and world integration on the legislative support for the development of higher education in Ukraine. Legislative and regulatory support of the activities of higher education institutions in Ukraine. Development prospects and legislative support for vocational and professional before higher education. Legislative support for the management of institutions of general secondary, preschool and extracurricular education. Legal support of financial and economic activities and organization of labor protection in educational institutions. Foreign experience of functioning and legislative support of educational institutions. Organizational and pedagogical foundations of management and self-management in the activities of the head of an educational institution. Making management decisions in an educational institution. Professional requirements for the head of an educational institution. Ethics of the head of an educational institution.

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**Training of masters of sciences  
in branch of knowledge "Social Work"  
in specialty 231 "SOCIAL WORK  
educational program "SOCIAL AND PSYCHOLOGICAL REHABILITATION"**

Form of Training:	Licensed number of persons:
– Full-time EPP	15
– Part-time	15
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Rehabilitation teacher, head of the center (psychological support, social work, adult social and labor rehabilitation, providing social services)

### **The concept of training**

Training of qualified specialists is conditioned by the need of our state for highly professional social workers. This need is exacerbated by the complex socio-economic, environmental conditions of our time, as well as the hostilities in eastern Ukraine. There is an urgent need to train specialists who are able to carry out social and psychological rehabilitation of different population groups (including persons who have suffered from natural and man-made emergencies) on the basis of "ecological social work" and to manage the rehabilitation institutions/social services.

### **Areas of employment of graduates**

Our graduate can work in the following positions: Senior official of a public organization (in culture, education, charity, human rights, etc.); chairman (another top official) of a branch of a public organization (humanitarian, specialized); the head (leader) of the institution of social protection of the population; director of an institution (establishment) providing social services; director of rehabilitation institution (center) for persons with disabilities; head of the department (social services); manager (director) in the social sphere; instructor of social pedagogy; social tutor on work with children with disabilities; rehabilitation teacher; social educator; social worker; social work specialist; specialist in project and program management in material (immaterial) production; methodologist on vocational rehabilitation; methodist of educational and methodological work on rendering social services.

### **Practical training**

Practical training is carried out according to the schedule of the educational process directly on the certified practice bases, including: rehabilitation centers; centers for social and psychological rehabilitation; territorial centers of social service; community service centers for families, children and young people

### **Proposed Topics of master's qualification thesis**

1. Socio-psychological rehabilitation of the participants of military conflicts.
  2. Socio-psychological rehabilitation of the families of military personnel.
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3. Socio-psychological rehabilitation of internally displaced persons.
4. Socio-psychological rehabilitation of parents having children with disabilities.
5. Social rehabilitation of the elderly in stationary treatment institutions of the social protection system.
6. Socio-psychological rehabilitation of the disabled.
7. Technologies of social and psychological rehabilitation of the victims of emergencies.
8. Educational and rehabilitation work in children's rehabilitation institutions.

**Curriculum of Master training  
in educational program "Social and psychological rehabilitation"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Foreign language for business communication	4	exam
CC 2	Methodology and organization of scientific research	4	exam
CC 3	Social project management	4	exam
<b>Total</b>		<b>12</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Social rehabilitation and "green" social work	5	exam
CC 4	Management of rehabilitation and social services institutions	6	exam
CC 5	Rehabilitation psychology	6	exam
CC 6	Inclusive pedagogy	5	exam
CC 7	Production Practice	16	test
CC 8	Preparation and defense of master's qualification thesis	12	exam
<b>Total</b>		<b>50</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty</i></b>			
OC 1	Social and psychological rehabilitation for families	5	test
OC 2	Basic course of physical and medical rehabilitation	5	test
OC 3	Digital marketing in social sphere	5	test
OC 4	Advertisement and information technologies in social sphere	5	test
OC 7	Premedical training	5	test
OC 6	Social project management	5	test
OC 7	Organization of rehabilitation in different social groups	5	test
OC 8	Head of the institution	5	test
<b>Total</b>		<b>40</b>	
<b>The total amount of compulsory components</b>		<b>62</b>	
<b>The total amount of optional components</b>		<b>28</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

## **Annotations of disciplines in the curriculum**

### **GENERAL TRAINING CYCLE**

#### **Compulsory components of EPP**

**Foreign language for business communication.** Development of knowledge and skills necessary for reading professional and scientific literature, conducting a conversation in the mode of "leader – subordinate", "subordinate – leader", making annotations and summarizing texts.

**Methodology and organization of the scientific research.** The concept of the scientific research methodology. Priority areas of research on social work. Preparation of master's diploma research. Planning of the scientific research. Theoretical methods of the scientific research. Empirical methods of the scientific research. Experimental method. Implementation of mathematical statistics methods in the scientific research. Verification of the research results.

**Social project management.** Students study the categorical apparatus of discipline, investigate the stakeholder environment and identify sources and opportunities for project financing, research how to increase the effectiveness of projects, methods and specifics of social project assessment, study to find grant programs, prepare their own project aimed at social problems solution.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Socio-pedagogical rehabilitation.** The meaning of the "social rehabilitation" concept. Social and pedagogical activities, forms, methods and technologies that helps a child (or a person) to restore lost social connections and functions, filling the life support environment, personal care increase. "Green" social work.

**Management of rehabilitation and social services institutions.** Rehabilitation institutions as the elements of social space. Structure and features of a rehabilitation institutions management. Psychological aspects of a rehabilitation institution management. The process of making administrative decisions, as part of management and an element of administrative science. The global market of a rehabilitation industry as a stimulating factor for improving the management system of a rehabilitation institution. Personality of the head of a rehabilitation institution. Logistic system of a rehabilitation institution management. Service quality management in a rehabilitation institution. Marketing environment of a rehabilitation institution. Price and price formation for rehabilitation services. Distribution and promotion of rehabilitation services. Internal marketing of a rehabilitation institution. Motivation in personnel management. Interpersonal communications in a rehabilitation institution management.

**Rehabilitation psychology.** General concept of rehabilitation, its essence and types. Main components of rehabilitation. Subject, tasks of rehabilitation psychology and phase of the rehabilitation process. Basic principles of the rehabilitation program implementation and the rehabilitation program determining steps.

**Inclusive pedagogy.** Provides acquaintance of students with scientific and methodological bases of inclusive education and features of organization of inclusive education of children.

#### **Optional components of EPP**

##### ***Free choice according to specialty***

**Social and psychological rehabilitation for families.** Parental responsibility formation, parental potential revival, independent living skills formation, families leading-up for return of the child from boarding schools, social integration of families.

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**Basic course of physical and medical rehabilitation.** Means of physical rehabilitation, their classification, indications and contraindications of their usage; mechanism of positive impact of physical activities; methods of study and evaluation of individual personality features; rules and methods of activity dosing; process of motor skills forming; basic forms of physiotherapy, modes of physical activities; rules of physiotherapy preparation and produce; physiotherapy reaction studding and evaluation; organization of physical therapy; different types of therapy in rehabilitation institutions.

**Digital marketing in social sphere.** Social media marketing (SMM) as a special tool of Digital marketing. Promotion of products, services, companies, brands, etc. through the use of social media. Creation and update of content by visitors. Mechanisms of viral marketing increase of the amount of information displayed on the site, search engine rankings.

**Advertisement and information technologies in social sphere.** Specificity of using the advertising and information technologies in social sphere, strategies and technologies of interaction between social worker and media; specificity of advertising activities of social workers and institutions.

**Premedical course.** Emergency regulations. Technique of carrying out emergency assistance of the victims. Actual requirements for victim emergency evacuation. Emergency assistance in case of acute insufficiency. Cardiopulmonary resuscitation. Premedical help in case of injuries. Premedical help in a state of shock.

**Premedical training.** Rules of conduct at the emergency site. Technique for the inspection of victims. Modern requirements for emergency evacuation of victims. The provision of premedical care in acute failure. Cardiopulmonary resuscitation. Domestic care in case of injury. The provision of medical care in case of shock.

**Organization of rehabilitation in different social groups.** Organization of rehabilitation with: addicted people; people affected by human trafficking; girls (14-18 years) and women victims of violence; families with deviant behavior children; unemployed youth; children and young people victims of bullying; refugees and internally displaced person; war veterans and their families. Social protection of people affected by the Chernobyl disaster.

**Head of the institution.** Management of the institution. Responsibility of the supervisor for educational, financial, economic and other activities of the institution.

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**Training of masters of sciences  
in branch of knowledge "International relations"  
in specialty 291 "INTERNATIONAL RELATIONS, PUBLIC COMMUNICATION  
AND REGIONAL STUDIOS"  
educational program "INTERNATIONAL RELATIONS, PUBLIC COMMUNICATION  
AND REGIONAL STUDIOS"**

Form of Training:	Licensed number, people:
– Full-time	40
– Part-time	30
Duration of Training:	
– Full-time educational and professional program	1 year and 4 months
– Part-time	1 year and 4 months
Credits ECTS	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of International Relations, Public Communications and Regional Studios

### **Concept of training**

Training in the field of international relations, public communications and Regional Studios is a response to a notable request of government and businesses, and therefore society for highly qualified professionals in the context of setting up, development and moving to the new level of partnership and communication between different in structure and functionality subjects of international relations and law. Planned by curriculum systematic mastery of a number of professional and operational knowledge and skills will allow specialists in international relations navigate well in the socio-political, economic and cultural movements and events specific to the different level and scales of relations and cooperation between the subjects of international relations, perform their duties as the professionals.

### **Areas of employment of graduates**

A specialist in international relations, public communication and regional studies can be employed at embassies, consulates, trade representations and other representative organizations of Ukraine; offices of other countries and international organizations in Ukraine; Ukraine joint-stock foreign, public and private enterprises; public organizations that have close contacts with foreign countries; structural units of President of Ukraine Office; Secretariat of the Supreme Council of Ukraine; structural units of Cabinet of Ministers of Ukraine; Ministry of Foreign Affairs of Ukraine; Ministry of Foreign Economic Relations of Ukraine; other national agencies, that are a subdivision of Foreign Affairs; domestic and foreign research institutes and laboratories.

### **Practical training**

Practical training is carried out according to the schedule of the educational process directly in certified practical institutions, including: trade representations and other representative organizations of Ukraine abroad; foreign states representations and international organizations in Ukraine; Ukraine-foreign joint stock, public and private enterprises; public organizations which have close contacts with foreign countries; structural units of Cabinet of Ministers of Ukraine; Ministry of Foreign Economic Relations

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of Ukraine; other republican departments, that are a subdivision of Foreign Affairs; domestic and foreign research institutes and laboratories.

### Proposed Topics of master's qualification thesis

1. Global models of agriculture support
2. NATO-Ukraine relations: current status, challenges and prospects
3. Security issues in the African region
4. Problems and prospects of developing the free trade zone between the European Union and Ukraine
5. The Afghan conflict in the 21st century
6. Ukrainian-Swiss relations: current state and development prospects
7. Ukrainian-Polish relations in the political sphere: historical development, current state, problems and prospects
8. Cooperation between Ukraine and the European Union in the agricultural sector
9. Relations between developed and developing countries in the XXI century.

### Curriculum of Master training in educational program "International relations, public communications and regional studios" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components EPP</b>			
CC 1	Ukraine in the System of Contemporary World Politics	4	exam
CC 2	Practicum of Translation	15	test, exam
CC 3	Agrarian Policy of the World Developed Countries	4	exam
<b>Total</b>		<b>23</b>	
<b>Optional components EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines</i></b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components EPP</b>			
CC4	Methodology and Organization of Scientific Research	4	exam
CC 5	International Systems and Global Development	4	exam
CC 6	Multilateral Diplomacy and Mechanisms for Regulating International Relations	4	exam
CC 7	International Cooperation in Agriculture	4	exam
CC 8	International Organizations and Global Problems of Modern Age	4	exam
CC 9	Political Science of International Relations	4	exam
CC 10	Ukraine in the Contemporary Geopolitical Area	4	exam
CC 11	Language of Diplomatic Documents	4	exam
CC12	ProductionPractice	4	exam
CC 13	Preparation and defense of master's qualification thesis	7	exam
<b>Total</b>		<b>43</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty</i></b>			
OC 1.1	Foreign Policy Communication Technologies	4	exam
OC 1.2	Global and National Security		
OC 2.1	Economy of Foreign Countries	4	exam

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
OC 2.2	World Agriculture		
OC 3.1	EU Regional Policy	4	exam
OC 3.2	International TradeLaw		
OC 4.1	Agrarian Diplomacy	4	exam
OC 4.2	Public and Cultural Diplomacy		
<b>The total amount of Compulsory components</b>		<b>66</b>	
<b>The total amount of Optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

### Annotations of subjects in the curriculum

#### GENERAL TRAINING CYCLE Compulsory components EPP

**Ukraine in the System of Contemporary World Politics.** Topical issues of Ukraine's place and role in the modern world, the foreign policy of the state in international relations, aimed at its participation in solving global problems of today, are considered.

**Practicum of Translation.** General, lexical-phraseological and morphological-syntactic aspects, as well as the main tasks of translation studies; rules of translation as a type of communicative activity, principles of achieving translation adequacy at the level of equivalence.

**Agrarian Policy of the World Developed Countries.** The main directions and ways of international division of labor in the agricultural sphere in the global and regional dimensions are considered, as well as general principles, nature and mechanism of state policy in the agricultural sphere on the example of best practices of leading countries.

#### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of EPP

**Methodology and Organization of Scientific Research.** Theoretical and practical issues of modern research in the field of international relations, methodology of writing articles, abstracts, information reviews, etc., problematic aspects of preparation for a master's thesis, taking into account the latest requirements for such a scientific component of training international masters are considered.

**International Systems and Global Development.** The formation and development of systems of international relations, their features, main trends and stages of evolution are studied. Global and regional aspects of international relations and world politics are covered. The peculiarities of the activity of Ukrainian diplomacy in the international arena are revealed.

**Multilateral Diplomacy and Mechanisms for Regulating International Relations.** The basic principles, mechanisms and directions of realization of multilateral diplomacy, in particular in the field of regulation of modern international relations in the conditions of globalization are considered.

**International Cooperation in Agriculture.** The problems of international cooperation in the field of agriculture, in particular cooperation in solving the most pressing problems of its development, the introduction of new technologies, improving the ecology of agriculture and more.

**International Organizations and Global Problems of Modern Age.** It is revealed how the globalization and interconnectedness of the world has led to an increase in the role of international organizations diplomacy, which is carried out at the highest level and allowed to make cardinal decisions on the most acute international problems during the

second half of the XX century and the beginning of the XXI century and thus drastically change the international situation.

**Political Science of International Relations.** Paradigmatic, conceptual and praxeological aspects of international relations and world politics are considered in the context of evolutionary development of domestic and foreign political science.

**Ukraine in the Contemporary Geopolitical Area.** The role of Ukraine in modern international relations and world politics, the relationship and mutual influence of Ukrainian diplomacy and geopolitics are described. Various aspects of international relations, geopolitics and geostrategy are considered through the prism of Ukrainian national interests.

**Language of Diplomatic Documents.** The content of the EPP aims to prepare future diplomats for verbal communication in their diplomatic practice, the rules of writing diplomatic and other official documents.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Foreign Policy Communication Technologies.** Introduces students to the history of the emergence and formation of foreign policy communication, its main manifestations and implementation in the modern international environment.

**Global and National Security.** The global and regional dimensions of solving the problem of world security, the activities of Ukrainian diplomacy to join the world security policy in today's globalized world are covered.

**Economy of foreign countries.** The most important aspects of the economy of foreign countries in their holistic interaction, which forms the world economy, are considered. The main attention is paid to the characteristics of the economic potential of countries and regions, economic policy of governments, factors influencing the dynamics of economic development and its structure. The ethnocultural features of the countries influencing the business behavior of their businessmen are also considered.

**World Agriculture.** The state, structure, problems of agricultural development as one of the global problems of the present are considered against the background of the current possibilities of science and industry to provide mankind with agricultural products.

**EU Regional Policy.** The characteristic features of the European Union as a unique integration association are studied in the global and regional system of international relations through the revealing of historical features and institutional principles of the EU, the process of EU enlargement in Central and Eastern Europe, internal changes related to Europeanization, regional policy of organization.

**International Trade Law.** The discipline deals with the features of functioning of world trade relations, peculiarities of trade institutional system, and also questions of realization of legal regimes of world trade.

**Agrarian Diplomacy.** The main features, directions of realization and efficiency of realization of the state interest on the international arena in the agriculture sector by means of economic influence with application of classical and specific approaches of diplomatic activity of the countries are analyzed.

**Public and Cultural Diplomacy.** The peculiarities of the functioning of public and cultural diplomacy, in the system of existing and promising foreign diplomatic relations of Ukraine, the formation of the image of the state and its institutions at the international level, as well as cultural and diplomatic issues facing the state are considered.

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**EDUCATIONAL AND RESEARCH INSTITUTE  
OF CONTINUING EDUCATION AND TOURISM**

**Director** – Doctor of Law Science, Professor Ivan Grytsenko

Tel.: (044) 527-87-42, 527-86-53

E-mail: sec\_edu\_nni\_director@nubip.edu.ua

Location: Educational Building Number 10, room. 219

Educational and Research Institute of Continuing Education and Tourism organizes and coordinates the educational process of Master's preparation for educational programs within the speciality:

**Specialty 073 "Management"**

***Educational program "Management of Innovative Activity"***

Guarantor of the educational and professional program - Olga Vytvytska, Doctor of Economics, Professor

Departments in charge of graduate training:

**Public Administration, Management of Innovative Activity and Extension Service**

Tel.:(044) 527-86-53

E-mail: public\_admin@nubip.edu.ua

Head of department – Sergii Prylipko, Doctor of Science in Public Administration, Associate Professor

***Educational program "Extension Service"***

Guarantor of the educational and professional program – Tetyana Kalna-Dubinyuk, Doctor of Economics, Professor

Department in charge of graduate training:

**Public Administration, Management of Innovative Activity and Extension Service**

Tel.: +38(067)7083679

E-mail: agroadvice@ukr.net

Head of department – Sergii Prylipko, Doctor of Science in Public Administration, Associate Professor

***Educational program "Management of Tourism and Hotel and Restaurant Business"***

Guarantor of the educational and professional program – Inna Levytska, Doctor of Economics, Professor.

Department in charge of graduate training:

**Tourism, Hotel and Restaurant Business**

Tel.:(044) 527-80-61

E-mail: ilevytska@nubip.edu.ua

Head of department – Doctor of Economics, Professor Inna Levytska

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### **Specialty 242 "Tourism"**

#### ***Educational program "International tourism business"***

Guarantor of the educational and professional program – Doctor of Economics,  
Docent Alona Klymchuk

Department in charge of graduate training:

**Tourism, Hotel and Restaurant Business**

Tel.: (044) 527-80-61

E-mail: ilevytska@nubip.edu.ua

Head of department – Doctor of Economics, Professor Inna Levytska

### **Speciality 281 "Public management and administration"**

#### ***Educational program "Public management and administration"***

Guarantor of the professional program – Sergii Prylipko, Doctor of Science in Public  
Administration, Associate Professor

Department in charge of graduate training:

**Public Administration, Management of Innovative Activity and Extension  
Service**

Tel.: (044) 527-86-53

E-mail: pub\_admin@nubip.edu.ua

Head of department – Sergii Prylipko, Doctor of Science in Public Administration,  
Associate Professor.

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty 073 "MANAGEMENT"  
educational program "MANAGEMENT OF INNOVATIVE ACTIVITY"**

Form of Training:	Licensed number of persons:
– Part-time	15
Duration of Training:	
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master of Management of innovative activity

**The concept of training**

Ukraine's current achievements in the international dimension of economic competitiveness, level of development and especially the efficiency of the national innovation system are not enough to ensure the development of domestic economy. Thus, there is a need for high-level professionals, who possess not only special knowledge, but also will be able to make strategic and tactical innovative decision, to identify perspective scientific developments and to implement into production new products (services), to improve the mechanisms of promotion of products to the market, to create and use new methods of calculation and justification of socioeconomic indicators and evaluation of innovative projects results; to design and implement business model innovation entrepreneurship, to commercialize intellectual development achievements.

**Areas of employment of graduates**

Master of educational program "Management of innovative activity" can hold positions as of heads and deputies for development of enterprises and organizations, in consulting centers, innovation structures of central state and regional authorities, innovation funds, innovative financial and credit institutions of scientific and industrial complexes, financial and industrial groups, technology parks.

**Practical training**

The task of practical training is to train professionals who will be able to solve production problems in the current market conditions, and will own techniques and methods that are components of company's management of innovative activity. The bases of practical training are leading enterprises of Ukraine. In particular: LLC «Institute of innovation providing", NAAS of Ukraine, LLC "Kernel-Trade", association with additional responsibility "Terezine", farmer economy "Nina", separated subdivision of NULES of Ukraine and others.

**Proposed Topics of master's qualification thesis**

1. Innovative solutions in enterprise management.
  2. Management of commercialization of innovative products in the agricultural sector
  3. Formation of strategy of innovative development of enterprises.
  4. Management of international innovation.
  5. Management of innovative processes for the development of enterprise
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personnel.

6. Information systems in the management of innovation activities of the enterprise.

7. Formation of innovation and investment attractiveness of the enterprise.

**Curriculum of Master training  
in educational program "Management of innovative activity"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Agrarian Policy	5	exam
CC 2	Innovation agrotechnology	4	exam
CC 3	Methodology of scientific research	4	exam
<b>Total</b>		<b>13</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students in the list of subjects</i></b>			
OCP 1	Optional discipline 1	4	test
OCP 2	Optional discipline 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Innovation management	6	exam
CC 5	Economics of innovative enterprises	5	exam
CC 6	Management consulting	4	exam
CC 7	Intellectual property	5	exam
CC 8	Information systems and technology of management	5	exam
CC 9	Financial and investment management	5	exam
CC10	System analysis and management decisions	5	exam
CC11	Strategic management of innovative development	5	exam
CC12	HR management	4	exam
CC 13	Production Practice	4	
CC 14	Preparation and defense of Master's qualification thesis	5	public defense
<b>Total</b>		<b>53</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty</i></b>			
OC 1.1	Marketing innovation	4	exam
OC 1.2	Technology transfer		
OC 2.1	Innovation projects management	4	exam
OC 2.2	Logistical support of innovation		
OC 3.1	Organization of innovative businesses	4	exam
OC 3.2	Quality management		
OC 4.1	International management	4	exam
OC 4.2	Innovation providing		
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE  
Compulsory components of EPP**

**Agricultural policy.** Purpose of the discipline - the mastery of theoretical and

methodological bases of formation and implementation of agricultural policies, ability to assess its effectiveness and justify the choice of certain measures of state regulation.

**Innovation agrotechnology.** The course promotes the formation of competent skills in the modern production and processing of crop production, animal husbandry; studying the principles of functioning of robotic complexes of their executive mechanisms, basics of biosafety; studying the basics of bioengineering; study of the basics of nanomaterials and technologies for further use in the industrial and agro-industrial sectors.

**Scientific research methodology.** Knowledge formation on the methodology, theory and method process, methodological support of research activities, application of theoretical and empirical research methods; specificity of scientific knowledge; content and structure of the process of scientific research; execution of research results and their implementation in practice; determine the cost-effectiveness research.

### **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

#### **Compulsory components of EPP**

**Innovation management.** Mastering the theoretical knowledge of the organization and management of innovative activity of the enterprise, industry, region, country, and tools, methodology development of innovative strategies for the development and acquisition of practical skills for evaluating performance, identification of reserves to improve the efficiency of innovation.

**Economics of innovative enterprises.** The course provides for the acquisition of theoretical knowledge and practical skills for obtaining and evaluating indicators of forming the economic and production activity which is engaged in innovative activities on the basis of factors external and internal environment; review the process of forming competitive strategy on the basis of scientific and technical progress.

**Management consulting.** Academic discipline provides theoretical and practical knowledge on the development of consulting management in the world and its formation in Ukraine, the main types of consulting services and their application for the adoption of scientifically based solutions, market research and professional consultant, consulting methods, interactive electronic consulting systems.

**Intellectual property.** Mastering the knowledge and skills in the field of protection and use of intellectual property. To acquaint students with the basic characteristics of objects relating to intellectual property; disclosure of the role of intellectual property in economic and cultural development of our society.

**Information systems and technology of management.** Formation of theoretical and practical knowledge of the foundation establishment and computer operation information systems and technologies in management. The objective of discipline is to study the construction and operation of information technology and information systems in enterprises, regulatory framework, modern approaches to their design and implementation.

**Financial and investment management.** Mastering knowledge about the system of principles, methods, means and forms of monetary relations and financial management, to improve production efficiency and product distribution. The study forms and mechanisms of investment activity of the enterprise to ensure effective development and continuous growth of the market value of the company.

**System analysis and management decisions.** Formation of knowledge on modern methods of systems research in the area of economic management, as well as students get practical skills using modern methods of development and adoption of innovative solutions.

**Strategic management of innovative development.** Mastering the latest knowledge in strategic management of innovative enterprise development and acquisition

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of practical skills for the development of risk management in order to optimize the level of risk in the innovation enterprise.

**HR management.** Acquiring by students' theoretical knowledge on effective management of labor collective of innovative enterprises on the basis of scientific principles and methods developed by domestic and foreign experts, and positive experience of advanced enterprises.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Marketing innovation.** Acquiring by students theoretical knowledge in marketing innovative and practical skills on the formation of the marketing innovations to the market; creation of strategic marketing and innovative software development company in a dynamic market environment.

**Technology transfer.** Mastering of knowledge and skills in the field of technological audit, technology transfer, introduction into economic circulation of intellectual property. Peculiarities of technology commercialization.

**Innovation projects management.** Knowledge and skills acquiring of innovative projects management using the tools in the management of innovation projects, the examination of innovative projects and programs.

**Logistical support of innovation.** Establishing of modern knowledge about the nature and content of logistic support innovation, practical skills concerning logistics solutions support innovation, evaluation and selection of the optimal solution for the initial conditions to ensure the effective operation of the company.

**Organization of innovative businesses.** The course reveals the basis for the organization of innovative small businesses with modern methods research breakthrough areas of science, technology and civil society through innovative educational space University in partnership with academia, business, government on the basis of international experience and is aimed at the formation of ideas, knowledge and skills.

**Quality management.** Knowledge and skills formation on quality management of innovation activities of enterprises. System quality innovative enterprises.

**International management.** The purpose of discipline is to form a system of modern theoretical foundations and international management environment, new technologies, management of international corporation's methods to solve their key problems of innovative development in a globalized economy; developing abilities to apply the methods and tools of international management at Ukrainian enterprises.

**Innovation providing.** Forming knowledge about system innovation process, creative logic newly created (innovation), which provides updates and technological progress of society through the effective work of the creator, the results of which are market demand and equivalent economic proposal combines three market systems: research, innovation and entrepreneurship the creation and transfer of scientific, technical, and technological innovation and industrial and consumer products, regulating force which is effective innovation policy, based on an economic basis of scientific knowledge and driving force - motivated management and business capital.

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty 073 "MANAGEMENT"  
educational program "EXTENSION SERVICE "**

Form of Training:	Licensed number of persons:
– Part-time	15
Duration of Training:	
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master of Management in Extesion

**The concept of training**

Preparation of highly qualified specialists in advisory activities to disseminate knowledge and information on innovative areas of agricultural production and conservation ecology of the environment, social development of the village, children, youth, families, identify promising scientific developments and put them into production through the organization of informational and consultancy activities.

**Areas of employment of graduates**

Master in Extension Services may hold positions in the management apparatus of enterprises and organizations, in consulting centers, consulting organizations, advisory structures of central state and regional government bodies, advisory services, work as an advisor manager in various fields of activity, including in agricultural production, social sphere, to organize provision of advisory services on development of rural territories, children, youth, families, as well as to open advisory services, their consulting firms.

**Practical training**

The objective of practical training is to train professionals who are able to organize informational and consulting activities in the current market conditions and have techniques and methods of dissemination of knowledge and information for the development of competitive enterprises. Practical training bases are developed advisory organizations and enterprises, consulting centers, advisory structures of central state and regional governing bodies of Ukraine and abroad - Poland, Hungary, the Netherlands, Portugal, America, etc.

**Proposed Topics of master's qualification thesis**

1. Organization of consulting on the use of alternative energy sources in agricultural activities.
  2. Organization of consulting on the spread of biotechnology in plant production.
  3. Informational and consulting support for rural business.
  4. Advisory support for agricultural land lease relations enterprises.
  5. Organization of consulting on the use of information technology in production.
  6. Organization of training programs in advisory services.
  7. Organization of advisory services for the development of the social sphere of the village.
  8. Advisory support for rural tourism development.
  9. Organization of consultative activities of the community.
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10. Organization of counseling for growing tomatoes in greenhouses closed soil.

**Curriculum of Master training  
in educational program "Extension Service"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Agrarian Policy	5	exam
CC 2	Innovation Agrotechnology	4	exam
CC 3	Methodology of Scientific Research	4	exam
<b>Total</b>		<b>13</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to the preferences of students in the list of subjects</b></i>			
OCP 1	Optional discipline 1	4	test
OCP 2	Optional discipline 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Innovation Management	4	exam
CC 5	Economics of Innovative Enterprises	4	exam
CC 6	Consulting Management	4	exam
CC 7	Information Systems and Technologies at Management	4	exam
CC 8	PR- consulting in Agriculture	4	exam
CC 9	HR-management	4	exam
CC 10	Financial and Investment Management	4	exam
CC 11	Organization of Informational and Consulting Activities	4	exam
CC 12	Planning of Informational and Consulting Programs	4	exam
CC 13	Legal Regulation of Extension Service	4	exam
CC 14	Management of Agro-industrial Formations	4	exam
CC 15	Preparation and defense of Master's qualification thesis	9	public defense
<b>Total</b>		<b>53</b>	
<b>Optional components of EPP</b>			
<i><b>Free choice according to specialty</b></i>			
OC 1	Statistical Modeling and Forecasting in Management of Extension Service	4	exam
OC 2	System Analysis and Management Decision Making	4	exam
OC 3	Agricultural Extension Service	4	exam
OC 4	Risk Management of Agro-industrial Production	4	exam
OC 5	Organization of Training in Extension Service	4	exam
OC 6	Interactive Consulting Systems	4	exam
OC 7	Ethics of Extension Activities	4	exam
OC 8	Information and Consulting Support Sustainable Development	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

## Annotations of subjects in the curriculum

### GENERAL TRAINING CYCLE Compulsory components of EPP

**Agricultural Policy.** Purpose of the discipline - the mastery of theoretical and methodological bases of formation and implementation of agricultural policies, ability to assess its effectiveness and justify the choice of certain measures of state regulation.

**Innovation Agrotechnology.** The course promotes the formation of competent skills in the modern production and processing of crop production, animal husbandry; studying the principles of functioning of robotic complexes of their executive mechanisms, basics of biosafety; studying the basics of bioengineering; study of the basics of nanomaterials and technologies for further use in the industrial and agro-industrial sectors.

**Scientific Research Methodology.** Knowledge formation on the methodology, theory and method process, methodological support of research activities, application of theoretical and empirical research methods; specificity of scientific knowledge; content and structure of the process of scientific research; execution of research results and their implementation in practice; determine the cost-effectiveness research.

### SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of of EPP

**Innovation Management.** Mastering the theoretical knowledge of the organization and management of innovative activity of the enterprise, industry, region, country, and tools, methodology development of innovative strategies for the development and acquisition of practical skills for evaluating performance, identification of reserves to improve the efficiency of innovation.

**Economics of Innovative Enterprises.** The course provides for the acquisition of theoretical knowledge and practical skills for obtaining and evaluating indicators of forming the economic and production activity which is engaged in innovative activities on the basis of factors external and internal environment; review the process of forming competitive strategy on the basis of scientific and technical progress.

**Consulting Management.** Academic discipline provides theoretical and practical knowledge on the development of consulting management in the world and its formation in Ukraine, the main types of consulting services and their application for the adoption of scientifically based solutions, market research and professional consultant, consulting methods, interactive electronic consulting systems.

**Information Systems and Technology of Management.** Formation of theoretical and practical knowledge of the foundation establishment and computer operation information systems and technologies in management. The objective of discipline is to study the construction and operation of information technology and information systems in enterprises, regulatory framework, modern approaches to their design and implementation.

**PR-consulting in Agriculture.** The course aims at studying theoretical, methodological and practical issues of public relations in market conditions and the role of consulting in this, the concept of public relations technologies and organization of consulting on their use in crisis situations.

**HR-management.** Acquiring by students theoretical knowledge on effective management of labor collective of innovative enterprises on the basis of scientific principles and methods developed by domestic and foreign experts, and positive experience of advanced enterprises.

**Financial and Investment Management.** The discipline aims to form in students modern economic thinking and a system of special knowledge in the field of financial and

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investment management of enterprises, mastering the basic theoretical principles, acquiring the necessary competencies and mastering practical skills and abilities to ensure effective management of real and financial investments.

**Organization of Informational and Consulting Activities.** The course aims to study the theory and practice of organization of information-consulting activities in the world and the peculiarities of its formation and functioning in Ukraine, organization of consulting service, basic principles and methods of management, financing, experience in the organization of staffing and consulting process, licensing and certification of consulting activities.

**Planning of Informational and Consulting Programs.** The course involves the study of advisory programs in advisory services, their planning to meet the needs of agricultural production and the population in improving the level of knowledge, implementation of innovations.

**Legal Regulation of Extension Service.** Formation of the system of knowledge and practical skills in the organizational and legal support of advisory services, the creation of an advisory service, a consulting firm.

**Management of Agro-industrial Formations.** The discipline aims to give students a holistic and logically consistent amount of knowledge about the essence of management in the enterprise and organization, to reveal the basics of theory, methodology and practice of management under the market mechanism of management.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Statistical Modeling and Forecasting in Management of Extension Service.** The course involves providing theoretical and practical knowledge on modeling and forecasting in advisory services, identifying the most pressing problems and identifying science-based information and consulting services on this basis.

**System Analysis and Management Decision Making.** The course of this discipline aims to provide students with the latest knowledge on systems analysis and management decision-making and the acquisition of practical skills and abilities in systems approach, its principles and methods in research and design of complex organizational and technical systems, skills development, decision support tools, computing tools to solve practical system problems.

**Agricultural Extension Service.** The course aims to gain theoretical knowledge and practical skills in the development of agricultural advisory activities, mastering its programs, models, methods, technologies, organizing events and feedback, methods of evaluating results.

**Risk Management of Agro-industrial Production.** The purpose of the discipline is to acquire students' latest knowledge on risk management in innovative activities of agro-industrial production and the acquisition of practical skills to develop a risk management system to optimize the level of risk in the innovation of the enterprise; acquaintance with the degree of consideration of the goals and interests of various stakeholders in the current strategy of economic development in international markets.

**Organization of Training in Extension Service.** The course involves acquaintance with the theory and methodology of adult learning, learning methods, organization of training events and feedback, methods of evaluation of results.

**Interactive Consulting Systems.** The discipline involves the formation of a system of theoretical and practical knowledge on the basics of the creation and operation of interactive consulting systems, the development of consulting algorithms, databases and knowledge bases, the use of software for interactive consulting of science-based technology for the development of competitive production.

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**Ethics of Extension Activities.** The discipline involves the formation of a system of theoretical and practical knowledge of the rules of consulting, business and diplomatic protocol, modern methods and rules of doing business, accepted in world practice.

**Information and Consulting Support Sustainable Development.** Formation of a system of theoretical and practical knowledge of the principles, methods, types of information and consulting activities on the economic, environmental and social components of sustainable development of the agrosphere with the use of international experience of rational use of nature and environment.

**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty 073 "MANAGEMENT"  
educational program "MANAGEMENT OF TOURISM  
AND HOTEL AND RESTAURANT BUSINESS"**

Form of Training:	Licensed number of persons:
– Part-time	15
Duration of Training:	
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master of Management

**The concept of training**

The need to prepare applicants for the second (master's) level of master's education in the educational program "Management of tourism and hotel and restaurant business" due to the development of market relations in Ukraine, restructuring of the national economy, Ukraine's entry into the world economic space, in particular, international markets. World experience shows that the tourism industry restaurant and hotel industry is developing rapidly: existing and new hotel and restaurant complexes are expanding, the flow of tourists is growing, the requirements for the quality of service are growing every year.

Innovative direction of the processes of development of the tourism industry, hotel and restaurant industry, increasing competition in this area and consumer demands, control over the work of institutions by government agencies, the need to accelerate management decisions in turbulent environments raise the issue of professionalism. staff shortages, but also in the level of training. Today they are required to have a system of competencies based on knowledge of international service standards, integrated quality management systems, modern technologies for designing and developing tourist destinations, research and innovation. In the process of professional, theoretical training, applicants will gain in-depth knowledge, skills and abilities on the features of effective management of restaurant and hotel businesses and their structural units, which will allow them to survive in a competitive environment.

**Areas of employment of graduates**

Heads of enterprises, institutions and organizations, heads of small enterprises without management staff, managers (managers) of enterprises, institutions, organizations and their subdivisions, professionals in the field of tourism, researchers (tourism, sightseeing), tourism experts, managers (managers) of travel agencies and bureaus travel, managers (managers) in hotels and other accommodation, manager (manager) of food security systems, managers (managers) in restaurants, managers (managers) in cafes, bars, canteens, managers (managers) at enterprises that prepare and deliver ready meals, managers (managers) in the field of culture, recreation and sports, researchers, hospitality specialist (hotels, tourist complexes, etc.), tourist service specialist, organizer of cultural and leisure activities, rural tourism development specialist, specialist on tourist service, the assistant to the head of production division, the assistant to the head of m scarlet enterprise without management staff, other technical specialists in the field of management, conductor (by type of tourism).

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### Practical training

To ensure the practical training of applicants and their successful employment, establishes various forms of cooperation with tourism and hotel and restaurant businesses, as well as organizations on the basis of concluded training agreements, cooperation agreements, bilateral community agreements, agreements on internships for applicants. conditions for the implementation of internship programs and ensure full compliance with the requirements provided.

### Proposed Topics of master's qualification thesis

1. Development of franchising in the hospitality industry of Ukraine.
2. Small business development in the hotel industry (tourism).
3. The mechanism of state regulation of the development of tourism industry enterprises in modern conditions and ways to improve them.
4. Management of hotel enterprises (tourism) in large cities of Ukraine and ways to improve them.
5. Implementation of modern models and methods of enterprise decision management.
6. Implementation of modern management technologies in the enterprise.
7. Implementation of Anti-Crisis Management at the enterprise.
8. The economic mechanism of enterprise management and ways to improve it.
9. Service quality improvement strategy.
10. Organization of personnel work and customer service improvement.

### Curriculum of Master training in educational program "Management of Tourism and Hotel and Restaurant Business" (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory Components of EPP</b>			
CC 1	Methodology and Organization of Scientific Research	4	exam
CC 2	Personal Efficiency and Leadership	4	exam
<b>Total</b>		<b>8</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to the preferences of students in the list of subjects</i>			
OCP 1	Optional discipline 1	4	test
OCP 2	Optional discipline 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	Strategic Marketing in the Tourism and Hotel and Restaurant Business	4	exam
CC 4	Project Management in the Tourism and Hotel and Restaurant Business	5	exam
CC 5	Strategic Management of Tourist Destinations	4	exam
CC 6	Business Process Management in the Tourism and Hotel and Restaurant Business	5	exam
CC 7	Innovations in the Tourism and Hotel and Restaurant Business	5	exam
CC 8	Quality Management of Services in the Tourism and Hotel and Restaurant Business	5	exam



**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
CC 9	Revenue Management	5	exam
CC 10	HR - Hotel and Restaurant Management	4	exam
CC 11	Practical training	9	
CC 12	Preparation and defense of Master's qualification thesis	12	public defense
<b>Total</b>		<b>58</b>	
<b>Optional components of EPP</b>			
<i>Free choice according to specialty</i>			
OC 1.1	Tax Law	4	exam
OC 1.2	Contract and Labor Law		
OC 1.3	International law		
OC 2.1	Cross-cultural Management	4	exam
OC 2.2	International Protocol and Etiquette		
OC 2.3	Business psychology		
OC 3.1	Management of service organizations	4	exam
OC 3.2	Brand Management		
OC 3.3	Tourismology		
OC 4.1	Information Systems and Technologies in Management	4	exam
OC 4.2	Internet Technology in Business		
OC 4.3	Geoinformation Technologies and GDS		
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>			<b>90</b>

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of EPP**

**Methodology and organization of scientific research.** Theoretical and methodological principles of research in the field of tourism, developing skills of using pattern matching, methods and forms of scientific and practical knowledge, in process analysis of management and economy in tourism industry; application of theoretical and methodological principles of economics, management, geographical sciences and the science of tourism in organization of scientific research and writing qualification work (master thesis), implementation of specific methods of economic and regional-geographical analysis in tourism, basics of organization of researcher's work process, preparation of qualification work (master thesis) approbation of research results in scientific publications, at conferences, seminars, etc.

**Personal Efficiency and Leadership.** Forming a system of knowledge, applied skills and abilities to use the principles, types, tools of personal effectiveness and leadership of the leader and ensure long-term business partnerships in business. Basic concepts and concepts of leadership theory; advantages and threats of leadership behavior in tourism and hotel and restaurant activities; formation of a systematic idea of personal efficiency and leadership in tourism and hotel and restaurant activities.

**SPECIAL (PROFESSIONAL) TRAINING CYCLE**  
**Compulsory components of EPP**

**Strategic Marketing in the Tourism and Hotel and Restaurant Business.** Formation of a system of theoretical knowledge on marketing strategies and practical skills of management of strategic marketing activities of tourism and hotel and restaurant

business on the basis of studying legislative documents, normative, special, reference literature and resources of the world information network.

**Business Process Management in the Tourism and Hotel and Restaurant Business.** Theoretical and methodological principles of business process management in tourism and hotel and restaurant business; applied aspects of business process management of modern tourist and hotel and restaurant enterprises; scientific and theoretical basis of the concept of business process reengineering, which is embodied in the activities of tourism and hotel and restaurant enterprises; Internet technologies in business process management of tourist and hotel and restaurant enterprises to increase the efficiency and effectiveness of business processes of tourist and hotel and restaurant enterprises.

**Strategic Management of Tourist Destinations.** Modern scientific and praxeological approaches to the genesis of the concept, structure and management mechanisms of tourist destinations of different scales on the basis of sustainable development. Fundamentals of destination formation, principles, functions and mechanisms of their management, the main aspects of competitiveness of tourist destinations of different levels in terms of ensuring their sustainable development, features of marketing management of tourist destinations. Applied aspects of the best world and domestic practices of formation and management of development of tourist destinations.

**Business Process Management in the Tourism and Hotel and Restaurant Business.** Theoretical and methodological principles of business process management in tourism and hotel and restaurant business; applied aspects of business process management of modern tourist and hotel and restaurant enterprises; scientific and theoretical basis of the concept of business process reengineering, which is embodied in the activities of tourism and hotel and restaurant enterprises; Internet technologies in business process management of tourist and hotel and restaurant enterprises to increase the efficiency and effectiveness of business processes of tourist and hotel and restaurant enterprises.

**Innovations in Tourism and Hotel and Restaurant Business.** Current state and prospects of development of formats of establishments of tourist and hotel and restaurant economy according to changes of tourist and hotel and restaurant business; creation and directions of development of innovative forms of service of various-format establishments of tourist and hotel and restaurant economy, innovative forms of rendering of professional services; organization and management of innovative technologies in tourism and hotel and restaurant industry; innovation management, development and implementation of an innovative product, the use of innovative technologies in its formation, customer service; application of new information technologies of promotion and sale of services; formation of knowledge about the latest mechanisms and methods of management of international and domestic enterprises of tourism and hotel and restaurant sphere.

**Quality Management of Services in the Tourism and Hotel and Restaurant Business.** Formation of a system of knowledge on organizational, regulatory and legal issues of quality management, creation and implementation of quality management systems (QMS), the principles of their effective functioning, methods of quality control and evaluation, skills and abilities to apply general theoretical principles to solve specific control problems, ensuring, improving and managing the quality of products and services of tourism and hotel and restaurant industry. Students learn to systematically approach the analysis of the activities of tourism, hotel and restaurant facilities, develop skills to solve problems of quality improvement.

**Revenue Management.** Formation of a system of knowledge on measures to optimize the revenue management system of hotels and restaurants. Features and pricing strategies in the hotel and restaurant business; modeling of demand in the conditions of

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economic uncertainty faced by decision-makers in the hotel and restaurant business; methods of identifying income reserves of hotel and restaurant enterprises; basic revenue management strategies for hotels and restaurants; methods and features of information collection and processing in revenue management systems; analysis of profitability of hotels and restaurants.

**HR - Hotel and Restaurant Management.** Formation of professional competencies in human resources management in hotels and restaurants. Modern techniques of human management; recruitment, career planning; to acquire skills of conducting business trainings and mastering the peculiarities of their evaluation.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Tax Law.** Formation of a system of theoretical and practical knowledge in the field of tax law as a separate branch of jurisprudence, legislation and other regulations relating to these areas of public relations, tax relations, the legal status of revenues and fees, the basics of the tax process, the legal basis of tax control, protection of the rights and legitimate interests of the subjects of financial relations; acquisition by students of skills of work with financial and legal documents.

**Contract and Labor Law.** Disclosure of the most important categories and constructions of contractual and labor law and legislation in this area, the main trends in their development and application by public authorities of current legislation on the implementation of contracts, including labor. The study of contract law aims to acquire students' skills in working with normative material, the ability to resolve specific legal situations that arise in the field of contractual relations on the basis of national and international law. Students must also analyze law enforcement practices, court decisions and decisions of public authorities in terms of regulating contractual relations. The study and analysis of modern labor legislation governing the formation of the labor market, the organization and use of labor of employees is an important part of the development of the modern rule of law.

**International law Concepts and sources of international law.** Concept, structure and types of conflict rules. Basic attachment formulas. Legal status of individuals in international law. Legal status of legal entities in international law State as a party to private law relations with a foreign element Property relations in international law Treaty in international law International carriage of goods and passengers Obligations due to damage in international law Labor relations in international law International commercial arbitration

**Cross-cultural Management.** Formation of a system of theoretical knowledge and practical skills for effective management of organizations in a global economy, taking into account the characteristics and interaction of different cultures. Coverage of theoretical and methodological and applied aspects of cross-cultural management; methods and mechanisms of cross-cultural management; preparing students to work in a multicultural environment of modern business.

**International Protocol and Etiquette.** Acquaintance with the basic tendencies in modern international communication; learning the basics of international protocol and etiquette, diplomatic and international correspondence and communication through other means of communication. Formation of students' scientific worldview and high moral qualities; raising the general cultural level of students, expanding their theoretical and professional training; acquainting students with the basic principles of international protocol and etiquette.

**Business psychology.** Business psychology as an interdisciplinary science. Business psychology as a scientific and applied branch of psychological science.

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Structure, functions and main categories of business psychology. Analysis of the categories "entrepreneur", "businessman", "manager". Relationship between the concepts of "management", "entrepreneurship", "business". Prospects for development of the science. Basic and specific principles of science. Characteristics of business psychology main methods. Method of using methods of group work and solving group problems (brainstorming, method of synectics, method of socio-psychological training). The concept of entrepreneurial activity, its levels and types. Risk, its types and functions. Situations of uncertainty and risk. Leadership and the process of interpersonal interaction. Theories of leadership origin. Typology of entrepreneurs according to their attitude to innovations. The main recommendations for improving creative abilities of entrepreneurs. Personality as a central figure in the business process. Psychology of business communication in enterprise and business. The concept of communication in the socio-psychological dimension. The structure of business communication. Ethical and psychological principles of business interaction. Psychological features of entrepreneurial activity. System of psychodiagnostic methods for studying psychological features of business activity. A set of active methods and forms of psychological training for entrepreneurs to increase the efficiency of entrepreneurial activity. Psychological analysis of the content and essential characteristics of a competitive team.

**Management of service organizations.** Theoretical foundations of serviology. Classification of needs and their general characteristics. A systematic approach to the problem of human essence. Formation of the theory of needs in socio-historical development. Psychological concepts of human needs. Modern scientific concepts of human needs. Theoretical foundations of service activities. Modern classifications of services and features of service activity. Culture of service activity. Models of consumer behavior. The problem of quality and safety of modern service.

**Brand Management.** Formation of a system of professional competencies for the use of branding basics, methods of its organization for efficient management at the level of the main link of social production - the enterprise; acquisition of the necessary set of theoretical and practical knowledge to solve specific economic problems at the present stage of economic development. Forms of identification of economic laws and patterns of branding in the economic activity of the enterprise, methods, mechanisms, methodological approaches and practical experience of using brands by tourism and hotel and restaurant businesses in modern business conditions in Ukraine and developed market countries. Theory and practice of management, formation and use of branding; organization and effectiveness of marketing activities and other activities of the enterprise.

**Tourismology.** Formation of a system of knowledge about tourism, regularities of its formation, development and functioning, variety of approaches to its interpretation, features of motivation and bases of marketing and management in tourism, providing knowledge on specifics of functioning of subjects of tourist activity and features of work of the manager of tourist enterprise; to develop the ability to use knowledge of the discipline in practical and scientific activities.

**Information Systems and Technologies in Management.** Formation of a system of theoretical and practical knowledge on the basics of creation and operation of computer information systems and technologies in management. The task of the discipline is to study the construction and operation of information technology and information systems in enterprises, the regulatory framework, modern approaches to their design and implementation.

**Internet Technology in Business.** Formation of a complex of knowledge, skills and abilities necessary for increase of efficiency of professional activity by means of means of information technologies and systems. Hardware and software for information technology in tourism; composition of technical and software of the tourist organization,

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application of database management systems in the field of tourism and hotel and restaurant business; basics of construction and operation of local and global computer networks, protection of information in computer networks, basics of construction of automated enterprise management systems in the field of tourism, hotel and restaurant business; applied programs for the formation, promotion and implementation of a tourist product, automated reservation and reservation systems, automation systems for hotel and restaurant business management; information technologies of e-commerce in tourism, as well as the use of multimedia and the Internet in the practice of tourism business.

**Digital marketing technologies.** Formation of a system of theoretical knowledge and practical skills of application of modern digital technologies, principles, methods and tools of marketing. The concept and tools of digital technology. Digital technologies in product and price policy. Digital technologies in the distribution system. Digital technologies in marketing communications. Digital technologies in marketing research. Digital technologies of marketing analysis.

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**Training of masters of sciences  
in branch of knowledge 24 «Service sector»  
in specialty 242 «TOURISM»  
educational program «INTERNATIONAL TOURISM BUSINESS»**

Form of Training:	Licensed number of persons:
– Full-time EPP	30
– Part-time	40
Duration of Training:	
– Full-time educational and professional program	1 year 4 months
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master of Tourism

### **The concept of training**

The international tourism business is a big important part of the international economy, it is a difficult and complex sector, that has a strong impact on the structure and general condition of the global economy and can affect the domestic economies of the majority of countries and regions.

The educational program "International Tourism Business" is aimed at training highly qualified, socially mobile professionals with fluent English and other languages, who have general and professional competencies for successful economic, organizational, managerial, project, production and technological activities in the international tourism business.

Students will gain knowledge and skills to put into practice the basics of tourism law, national and international standards for tourist services, understanding of the principles, processes and technologies of the tourism business and its subsystems (administrative, socio-psychological, economic, technical and technological)

In addition, this training will form an individual educational trajectory through the study of interesting optional subjects, which will significantly expand the knowledge and skills of a master in the international tourism business.

### **Areas of employment of graduates**

International tourism business specialists will be able to do administrative work (management, financial or personnel management) and try themselves in creative areas - branding, creating new domestic and foreign tourism products, and starting a travel company. The tourism demand continues to grow, and quality offers are lacking, so graduates of the educational and professional program "International Tourism Business", who have a large amount of theoretical knowledge and practical experience, can succeed in this field.

### **Practical training**

Students gain in-depth knowledge of how to successfully start and develop a business, knowledge of effective management and how international organizations operate, supporting the concept of the information society as one of the factors of international development. The program is based on an interdisciplinary approach that allows students to gain competence in various aspects of the international tourism market and business management. In-depth study of foreign languages is the most important tool for understanding the processes taking place in the international tourism market. This

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allows not only to communicate freely, but also to master specialized literature. To ensure the practical experience of students and their successful employment, various forms of cooperation are established with the tourism industry, as well as organizations on the basis of training agreements, cooperation agreements, bilateral cooperation agreements, internship agreements, which creates comfortable and useful conditions for meeting the requirements of the educational and professional program and gain the degree.

### Proposed Topics of master's qualification thesis

1. Digital technologies of online sales of an international tour operator.
2. Formation of a sales network of an international tour operator on the Internet.
3. Technologies of integration growth of an international tour operator.
4. Tour operating of the domestic product of resort-based tourism on the international market.
5. Development of a franchise network of travel agencies of an international tour operator.
6. Development of a tourism product of a resort-type destination for the international market of health and wellness services.
7. Designing a tourism product for the international market of medical tourism.
8. Management of domestic tourism product (on the example of the region).
9. Development of attractiveness of a tourism product (name of an area, region, cluster, destination) in the international market
10. Formation of a tourism product (name of region, cluster, destination) for cultural tourism market in the EU.

### Curriculum of Master training in educational program «International tourism business» (educational and professional program of master's training)

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory Components of EPP</b>			
CC 1	Professional Foreign Language Communication	6	exam
CC 2	Methodology and organization of scientific research	3	exam
<b>Total</b>		<b>9</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to the preferences of students in the list of subjects</b>			
OCP 1	Optional subject 1	4	test
OCP 2	Optional subject 2	4	test
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 3	International Tourism	6	exam
CC 4	Management of Projects in Tourism	6	exam
CC 5	Development of Tourism Destinations	6	exam
CC 6	Innovations in Tourism	6	exam
CC 7	Quality Management of Services in Tourism	6	exam
CC 8	Strategic Marketing in Tourism	6	exam
CC 9	Pre-diploma Practical Training	9	
CC 10	Preparation and defense of Master's qualification thesis	12	Public presentation
<b>Total</b>		<b>57</b>	
<b>Optional components of EPP</b>			
<b>Free choice according to specialty</b>			

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Code n/a</b>	<b>Components of the educational program (education disciplines, course projects (paper), practice, qualification work)</b>	<b>Amount of credits</b>	<b>The final control</b>
OC 1.1.	Contract law	4	exam
OC 1.2.	Intellectual property		
OC 1.3.	Consumer law		
OC 1.4.	International law		
OC 2.1.	International protocol and etiquette	4	exam
OC 2.2.	Business psychology		
OC 2.3.	International credit - settlement and currency transactions-operations		
OC 3.1.	Management of service organizations	4	exam
OC 3.2.	Hotel business		
OC 3.3.	Digitalization of tourism		
OC 3.4.	Brand - management		
OC 3.5.	Behavior of consumers of hospitality services		
OC 3.6.	Organization of tourism		
OC 4.1.	International information systems in tourism	4	exam
OC 4.2.	Restaurant business		
OC 4.3.	Business process management		
OC 4.4.	Value-based management		
OC 4.5.	Servisology		
OC 4.6.	Tourismology		
OC 4.7.	International HRM in the field of hospitality and tourism		
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>The total amount of EPP</b>		<b>90</b>	

**Annotations of subjects in the curriculum**

**GENERAL TRAINING CYCLE**  
**Compulsory components of EPP**

**Professional Foreign Language Communication.** Development of professionally oriented intercultural communicative skills as a part of practical competence. Cross-cultural business relationship development; business, culture, and the environment. Making and receiving phone calls; phone conversations and cross-cultural communication; effective problem solving through phone calls. Presentations: presentation as a tool to influence any audience; various techniques of presentation preparation; beginning and main part of the presentation; questions and discussions. Meeting as a variant of business interaction: the procedure for running effective meetings; decision-making structure; how to close and end a meeting. Successful business negotiations: types of business negotiations; bargaining, trade agreements and concessions; conflict resolution; refusal to meet a demand.

**Methodology and organization of scientific research.** Theoretical and methodological principles of research in the field of tourism, developing skills in using pattern matching, methods and forms of scientific and practical knowledge, in process analysis of management and economy in tourism industry; applying of theoretical and methodological principles of economics, management, geographical sciences and the science of tourism in organization of scientific research and writing qualification work (master thesis), implementation of specific methods of economic and regional-geographical analysis in tourism, basics of organization of researcher's work process, preparation of qualification work (master thesis) approbation of research results in scientific publications, at conferences, seminars, etc.

## **SPECIAL (PROFESSIONAL) TRAINING CYCLE**

### **Compulsory components of EPP**

**International tourism.** Formation of the system of international tourism terminology, evolution of the formation and development of international tourism, assessment of the impact of international tourism on the national economy, methodological approaches to determining indicators of international tourism development and research of global and regional markets of international tourism services. The operation of multinational tourism business corporations, their types and models of management. International hotel chains as a form of multinational corporations in tourism, analysis of the state and priorities of development of tourism transnational corporations in the global and national markets. Features of organizational structures of tourism multinational corporations and an estimation of economic efficiency.

**Management of projects in tourism.** General description of project management in tourism. Substantiation of the project in tourism. Project planning in tourism. Time management during project implementation in tourism. Project risk management in tourism. Monitoring the implementation of the project in tourism. Project quality management in tourism. Assessing the effectiveness of project management.

**Development of tourism destinations.** Theoretical principles of formation and development of tourist destinations, methodology of tourism destinations research, competitiveness of tourism destinations, the behavior of consumers of the destination's tourism product, institutionalization of tourism destination management, tourism destination's marketing, tourist destination as a category of sustainable tourism development.

**Innovations in tourism.** Innovative project as a basis of innovation. Creative technologies of proactive management of innovation projects in tourism. Innovative tourism product. Innovative travel potential. Technological innovations in the processes of tourist services. Event marketing and marketing innovations in tourism. Providing of innovations in tourism. Methods and models for managing the development of innovations at tourism enterprises. Financial and investment support of innovation in tourism.

**Quality Management of Services in Tourism.** Scientific bases of quality management in tourism. Quality management of hotel and food & beverage services. Quality management of tourist services. Quality management of transport services. Personnel quality management in tourism. Methods of assessment and quality control in tourism..

**Strategic Marketing in Tourism.** Theoretical bases of strategic marketing. The main categories and concepts of strategic marketing. Subjects of marketing strategy development in tourism. Marketing environment of tourism businesses. Strategic planning. Methodological principles of marketing strategic analysis in the tourism industry. STP-marketing strategies of tourism businesses. Competitive marketing strategies of tourism businesses. Marketing strategies for the development of tourism businesses. Portfolio analysis. Portfolio marketing strategies of tourism business.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**Contract law.** Subject, method and system of contract law. Basic principles of contract law. Sources of contract law. Subjects of contract law. Obligations and contract in commercial contract law. Types of business agreements in Ukraine. Property transfer contract, rental agreement, service agreement.

**Intellectual property.** The concept of intellectual property, objects and subjects of intellectual property. The concept, principles and sources of copyright; objects and subjects of copyright; literary property law, art and cultural property law, scientific property; collective copyright management; liability for copyright infringement. Legal protection of

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related rights. Concepts and conditions of legal protection of inventions, utility models, industrial designs. Legal protection of non-traditional results of intellectual property. Legal protection of means of individualization of economic entities, goods, works and services. The concept and legal protection of commercial (brand) names; trademark and geographical indications. Protection from unfair competition. Liability for infringement of intellectual property rights.

**Consumer law.** The concept of consumer protection law. Consumerism as a global socio-political movement. Legal basis and characteristics of the Concept of national policy in the field of consumer protection. State protection of their rights and guaranteed level of consumption as basic consumer rights. General description of the basic rights and responsibilities of consumers. Regulations of consumer protection law. System and role of government authorities in consumer's protection. Responsibility for violating the law of consumer protection.

**International law.** The concept and sources of international law. The concept, structure and types of conflict of laws. Basic attachment formulas. Legal status of individuals in international law. Legal status of legal entities in international law. Role of the State in private law relations with a foreign element. Property rights in international law. International law and agreements. International freight and passenger transportation. International liability for injurious consequences. International labour law. International Commercial Arbitration.

**International protocol and etiquette.** Fundamentals of diplomacy and international business relations. Basic principles of diplomatic service. Diplomatic correspondence. Official visits. Business meetings. International courtesy. Diplomatic receptions. Specifics of diplomatic protocol norms in foreign countries. Diplomatic etiquette.

**Business psychology.** Basic concepts, methodology, methods, tasks and principles of business psychology. Psychological sources, factors, mechanisms and patterns of business development as a system. Psychological preconditions of business activity formation. The process of formation of business motivation; professionally important psychological and psychophysiological qualities of a businessman; socio-psychological factors of business success. Main directions and approaches in the assessment of professional and business qualities of a businessman; basics of recruitment and promotion. The main moral and ethical problems of modern business representatives. The role and importance of communication process; psychological significance of business communication in achieving success, psychology of decision making in a difficult situation.

**International credit - settlement and currency transaction-operations.** Exchange rates in the system of international credit and settlement, currency correlation. The methodological basis of international settlements. Financial and credit support of foreign economic activity. Practical aspects of using foreign exchange transactions as a basis for currency risk management of the enterprise / financial institution. Methods of preventing, accepting or reducing the currency risk of an enterprise / financial institution.

**Management of service organizations.** Theoretical foundations of service organizations. Classification of needs and their general characteristics. A systematic approach to the problem of human essence. Formation of the theory of needs in socio-historical development. Psychological concepts of human needs. Modern scientific concepts of human needs. Theoretical underpinnings of service provision. Modern classifications of services and features of service provision. The culture of service. Patterns of consumer behavior. The issue of quality and safety of modern service.

**Hotel business.** The Genesis of the hotel business. International, European, domestic approaches to the classification and typing of accommodation facilities. Classification and typification of hotel enterprises of Ukraine. Functional organization of hotel enterprises. Organization of the room capacity of hotel enterprises. Organization of

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administrative and non-residential groups of hotel premises. Cleaning technologies in ensuring the sanitary-hygienic and ecological requirements of the territory of hotel enterprises, vestibule group of premises, residential, non-residential and administrative premises. Hotel service booking systems. Mobile applications and information technologies in the organization of customer service. Logistic processes of hotel enterprises. Management of operational and functional divisions of hotel enterprises. The exterior and interior organization of hotel enterprises. Customer service standards. Ensuring the safety of guests in hotel. Effective staff management. Diversity of competencies according to different work requirements of hotel divisions.

**Digitalization of tourism.** Characteristics of modern information systems and technologies in the tourism business. Organization of information resources management of a tourist enterprise. Information and technical support of the tourism office. Automated management systems for enterprises. Use of internet technologies in tourism. Global (GDS) and alternative (ADS) distribution systems. Internet sites of travel companies. E-business in tourism. Multimedia and mobile technologies in tourism. Geographic information systems (GIS) in tourism.

Automation of planning and financial calculations in the tourism business management system. Automation of financial settlements. Organizational principles of automation of financial settlements in the tourism business, specifics of methodology. Formation of information support for automation of economic settlements. Software development. Intellectual support for solving financial and economic tasks.

**Brand-management.** Development of practical skills based on the basics of branding, methods of effective brand organization for a company; acquisition of the necessary set of theoretical and practical knowledge of solving specific economic problems at the present stage of economic development. Forms of identification of economic laws and patterns of branding in the economic activity of the enterprise, methods, mechanisms, methodological approaches and practical experience of using brands by tourism and hospitality businesses in modern business environment in Ukraine and in countries with developed market economies. Theory and practice of management, formation and use of branding; organization and efficiency of marketing and other types of enterprise activities.

**Behavior of consumers of hospitality services.** The concept, structure and nature of consumer behavior. Factors of external influence on consumer behavior. Factors of internal influence on consumer behavior. The decision-making process of the individual consumer. Organizational consumer decision making process. Behavioral reaction of buyers. Marketing tools to influence consumer response. Quantitative research on consumer behavior. Qualitative studies of consumer behavior.

**Organization of tourism.** Tourism as an industry. Terminology in tourism. Functions of tourism, conditions and factors of its development. The concept of tourist service, its socio-economic characteristics. Tourism product and its components. Classifications in tourism. Historical prerequisites of origin and development of tourism. Stages of tourism development in the world. History of tourism development in Ukraine. Modern travel policy. International regulation of tourism. International and regional tourism organizations. International instruments of influence on tourism development. Forms of tourist activity. Terms and principles of creation and operation of tourist enterprises in Ukraine. The essence and features of tour operators and travel agents. The concept and types of tour operating. The main types of tourism product distribution channels. Formation of a distribution network of tour operators.

**International information systems in tourism.** International information systems and technologies in tourism. Characteristics of international information systems. The main stages of development of international information systems. Types of information technologies in tourism. Origin and evolution of computer reservation systems. The

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structure and features of international travel websites. Creating a website for a travel company. Interactive travel plan and virtual brochures.

**Restaurant business.** Restaurant business as part of the hospitality industry. Types of catering establishments and their characteristics. Principles in choosing a restaurant location. Sales management in restaurants. Production and service processes. Material & technical base of production. Providing quality service in different types of restaurant establishments. Process of dealing with different types of customers. Organization of customer service in transport, participants in cultural, social and sporting events, hotel guests, foreign tourists, consumers in public places, markets and shopping malls.

**Business process management.** General description of the basic concepts of business process management. Characteristics of the main and auxiliary business processes of the hotel and restaurant business. The structure of the hotel's business processes. The structure of the restaurant's business processes. Stages of business process management of hotel and restaurant business entities. The role of information technology in business process management. Business process improvement methods. Business process reengineering. Types of changes in business processes of the tourism industry, which occurred due to the use of information technology.

**Value-based management.** Concept and theoretical basis of value-oriented management. Economic prerequisites for the application of the theory of value in enterprise management. Characteristics of the functions of values in the management of enterprises. Objects, subject, purpose, tasks, directions of implementation and system of principles of value-oriented management. The concept of building a system of value-oriented management. Integrated system for assessing the socio-economic value of the enterprise. Production chain as a basis for the formation of socio-economic value of the enterprise. Model of economic behavior of the consumer as an analytical basis for the formation of a system for assessing the consumer value of the product (service) of the enterprise. Methodical bases of estimation of customer base value of the enterprise. Quantitative and qualitative evaluation of the value of the client base of the enterprise.

**Servisology.** Formation and development of the service sector, its main stages. Types of service. Sectoral structure of the service industry. Role of service providing in people's life. Theoretical analysis of customer service. Basics of service theory. Theory and practice of national, regional, ethnic, demographic and climatic features of service. Modern service: expanding the relationship between producers and consumers of services. Individual service as separate type of service. Adaptive and dynamic characteristics of service. Modern service: the issue of quality and safety of service providing. Culture of service. Modern service technologies. Service in tourism. Foreign experience.

**Tourismology.** The system of knowledge about tourism, patterns of its formation, development and functioning, a variety of approaches to its interpretation, features of motivation and basics of marketing and management in tourism, providing knowledge on the specifics of tourism entities and features of tourism manager; Developing practical skills.

**International HRM in hospitality and tourism industry.** Theoretical principles of international HR-management. Staff in the system of international HR-management in tourism. Organization of international HR-management services. HR policy and HR strategy. Hospitality staff planning. Hiring and adaptation of staff in the field of hospitality. Assessment of professional competencies of staff. Human resources logistics in hospitality. Development of professional competencies of staff in the tourism industry. Organizational behavior and HR-management team in the field of hospitality and tourism. Effectiveness of international HR-management in hospitality and tourism.

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**Training of masters  
in branch of knowledge 28 "Public administration"  
in speciality 281 "PUBLIC MANAGEMENT AND ADMINISTRATION"  
educational program "PUBLIC MANAGEMENT AND ADMINISTRATION"**

Form of Training:	Licensed number of persons:
– Part-time	90
Duration of Training:	
– Part-time	1 year 4 months
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian, English
Qualification	Master of public administration

**The concept of training**

Preparation of public administration professionals capable of developing, analyzing and implementing public policy, effectively and efficiently performing managerial functions, facilitating innovative processes in public administration based on world and European standards. Specialists from state and local authorities are involved in the implementation of the content of the educational and professional program.

**Areas of employment of graduates**

In positions in state authorities, central and local executive bodies, local self-government bodies; in positions in structures of non-state entities of civil society and public organizations; in management positions and positions of specialists at the enterprises, establishments and organizations of different forms of ownership with non-profit status; management and administrative positions in international organizations and their representative offices in Ukraine.

**Practical training**

Practical training in state executive bodies, local self-government bodies, civil society institutions and other institutions and organizations whose activities are related with the sphere of public administration.

**Proposed Topics of master's qualification thesis**

1. Public administration in the development of agricultural business in the territorial community on cooperative basis.
  2. Public administration of cooperation between territorial communities in solving common problems of local importance.
  3. Mechanisms of interaction of state executive bodies with local self-government bodies at the regional (local) level.
  4. Public administration of socio-economic development of rural areas.
  5. Instruments for implementing social partnership in territorial communities.
  6. Improving of the mechanism of public participation in managing the development of united territorial communities.
  7. Public administration of investment projects of the region on the principles of sustainable development.
  8. Organizational and legal bases of regional development strategy formation.
  9. Improvement of tools for assessing the effectiveness of public authorities.
  10. Information and communication mechanism for cooperation between local authorities and territorial community.
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**Curriculum of Master training  
in educational program "Public management and administration"  
(educational and professional program of master's training)**

Code n/a	Components of the educational program (education disciplines, course projects (paper), practice, qualification work)	Amount of credits	The final control
<b>GENERAL TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 1	Public policy and European integration processes	5	exam
CC 2	Methodology and organization of scientific research	5	exam
CC 3	Foreign language in professional activity	4	exam
<b>Total</b>		<b>14</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to the preferences of students from the list of disciplines*</i></b>			
OCP 1	Optional subject 1	4	credit
OCP 2	Optional subject 2	4	credit
<b>Total</b>		<b>8</b>	
<b>SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>			
<b>Compulsory components of EPP</b>			
CC 4	Public management	5	exam
CC 5	Law in public administration	5	exam
CC 6	Organization of activities of public authorities	5	exam
CC 7	Public administration of national security	4	exam
CC 8	Strategic technologies in public administration	5	exam
CC 9	E-governance and e-democracy	4	exam
CC 10	Public administration	4	exam
CC 11	Communications in public administration	4	exam
CC 12	Practice by profession	5	credit
CC 13	Unified state qualification exam	3	exam
CC 14	Preparation and defense of Master's qualification thesis	8	public defense
<b>Total</b>		<b>52</b>	
<b>Optional components of EPP</b>			
<b><i>Free choice according to specialty **</i></b>			
OC 1	State regulation of agrarian sphere	4	exam
OC 2	Public administration of nature management	4	exam
OC 3	Management of state and municipal lands	4	exam
OC 4	Agrarian policy	4	exam
OC 5	Regional governance and local self-government	4	exam
OC 6	Public administration of innovation activity	4	exam
OC 7	Public finance management	4	exam
OC 8	Public governance	4	exam
OC 9	Legal regulation in separate spheres and branches of management	4	exam
OC 10	State anti-corruption policy	4	exam
OC 11	Quality management of public services	4	exam
OC 12	HR management in public authorities	4	exam
OC 13	Public administration in social and humanitarian sphere	4	exam
OC 14	Public administration of municipal institutions	4	exam
OC 15	Management psychology and conflictology	4	exam
OC 16	Professional ethics in public administration	4	exam
<b>Total</b>		<b>16</b>	
<b>The total amount of compulsory components</b>		<b>66</b>	
<b>The total amount of optional components</b>		<b>24</b>	
<b>THE TOTAL AMOUNT OF EPP</b>		<b>90</b>	

\* according to the Catalog of optional subjects for 2022-2023 <https://nubip.edu.ua/node/67362>

\*\* according to the list of optional subjects by specialty the student selects 4 subjects

**Annotations of subjects in the curriculum****GENERAL TRAINING CYCLE****Compulsory components of EPP**

**Public policy and European integration processes.** Theoretical and methodological principles of public policy: categories, patterns, principles, concepts, values, goals, priorities, directions; subject-object relations in public policy; classification of political-managerial relations; models and patterns of political-administrative interaction in public administration; mechanisms of public policy making and implementation; public policy resources; public policy analysis, evaluation of national and regional programs; political decisions; European and foreign principles of public policy making; European integration processes; Euro-Atlantic integration.

**Methodology and organization of scientific research.** The essence of key categories: subjects and objects, methods, forms, hypotheses, principles, models, approaches, concepts, doctrines, theories, paradigms, problems; factors, features, patterns, trends; relations, processes and interaction in the system of public administration and administration; methodology of research on problems of public administration; the main stages of the master's study are: choosing a topic, preparing a task and drawing up a work schedule, working with sources of information, observing academic integrity and checking for plagiarism.

**Foreign language in professional activity.** Complex foreign language training in professional activities: reading, listening, speaking; formation of skills of dialogic and monologic speech; preparation of students for professional communication in oral and written forms in a foreign language; negotiation; the concept of business communication; business correspondence; rules for drafting essays, resumes, CVs, official documents, statements, complaints, replies to the official application; rules of treatment and maintenance of business communication; rules and methods of communication in different situations; speeches at public events; preparation of joint proposals with foreign partners.

**SPECIAL (PROFESSIONAL) TRAINING CYCLE****Compulsory components of EPP**

**Public management.** Theoretical foundations of public administration; philosophy and history of public administration; directions of change in public administration; institutionalization of multilevel governance; network management and non-governmental structures; basic decision-making models; methods of development and decision-making; general requirements to formulating decisions; limitation of the problem, choice of goals, criteria for achievement of goals; methods of assessing the benefits and costs used in public administration; identification of costs and benefits that require evaluation; cost estimation in preparation of the decision; assessment of benefits in the preparation of decisions; comparison of alternative solutions; conceptual model of decision based on analysis of European Commission directives; the use of indicators in assessing the impact of management decisions; software indicators; taking into account the social component when making decisions in public administration; evaluation of management decisions; an algorithm for strategic decision making in the EU; methodology for evidence-based policy-making; civic competences.

**Law in public administration.** General provisions on the theory of state and law, constitutional and administrative law; legal regulation of the activity of public authorities and other entities of public administration; legislation on public service and service in local self-government bodies; legal liability of public servants; the relationship of public authorities with individuals and legal entities; legislative process; Ukrainian legislation and

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EU normative acts in the field of public administration, European integration, international obligations; regulations of foreign countries in the field of public administration.

**Organization of activities of public authorities.** Types, categories, patterns, principles, concepts, approaches, structure of public service; organizational-legal, managerial, social-psychological, moral-ethical and other principles of public service; organization of recruitment and public service; management of public service personnel; responsibility, competence, professional competence and professionalism of public servants; image, professional ethics and culture; corporate culture of public authorities; motivation, adaptation, evaluation and stimulation of professional activity of public servants; formation and development of vocational training system; development, adoption and implementation of management decisions in public authorities; personnel technologies; leadership.

**Public administration of national security.** Concepts, components, conceptual bases, laws, principles and basic directions of national security; basic legal acts regulating public relations in the field of national security; approaches to public administration of national security; current state of national security, major threats and challenges; state programs on national security; peculiarities of implementation of national security measures in various spheres (political, economic, food, information, military, environmental, information, etc.); national security management strategies in foreign countries.

**Strategic technologies in public administration.** Content, basic concepts, principles, functions, methods, features, types of strategizing; national, regional and local development strategies, concepts, programs; determining the appropriateness of strategic planning in the activities of public entities; goal formation; techniques, approaches, technologies, mechanisms and tools of strategy; institutional support for the implementation of projects and programs; identifying the needs of public authorities in attracting investment resources; sources of financing for investment projects; international technical assistance projects; public participation in the strategic process; management decision making; foreign strategic experience.

**E-governance and e-democracy.** Conceptual foundations, concepts, essence, organizational and institutional foundations of e-government and e-democracy; the legal framework for the implementation of e-governance and e-democracy technologies; managing the development of the information society; development of e-government at the state, regional and local levels; information and analytical support of administrative processes in public authorities; electronic interaction of public authorities; electronic workflow; electronic services; access to public information; protection of information; involvement of citizens in the decision-making process on the basis of modern technologies of development of e-government and e-democracy; foreign experience in using e-governance and e-democracy tools.

**Public administration.** Theoretical bases of public administration: concepts, content, features, functions, forms, laws, principles, mechanisms and tools; system of public administration bodies; development and implementation of management decisions at national, regional and local levels, monitoring and control over their implementation; developing and implementing measures to ensure the effective and efficient operation of public administration entities; basic principles of public administration in the social and economic spheres; the place and role of civil society institutions in public administration; anti-corruption activities in the field of public administration, responsibility in public administration.

**Communications in public administration.** Types, types, classification of communication and communication activities in public administration; methods, forms, types, technologies, techniques of communication and communication activities; current

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trends, principles, goals, decisions, rules, measures, communications policy; communication activity as a multi-channel system of interaction, communication skills; communicative strategies of public authorities; coordination of communication policy; government external communication policy; involving citizens in the development and implementation of public policy; building public support in the implementation of public-management and public-administrative decisions; foreign and domestic practices of public communications.

### **Optional components of EPP**

#### ***Free choice according to specialty***

**State regulation of agrarian sphere.** Food security in Ukraine; evolution of approaches to state regulation; bodies that carry out state regulation of agro-industrial complex; the main instruments of state regulation of the agro-food markets; peculiarities of state support for producers of crop and livestock products; classification of instruments of regulation of agricultural production; measures of state regulation of the internal agro-food market; government regulation that stimulates demand for agricultural products and measures that restrict supply of agricultural products; price policy in the agri-food market: tasks and basic tools; state administrative control over prices; tools for limiting the supply of agricultural products; instruments for increasing demand for agricultural products in the domestic market: public purchases of agricultural products, direct price subsidies to producers.

**Public administration of nature management.** Nature management as an object of public administration; the concept of sustainable development; subjects of public administration in the field of nature management; problems of rational use of limited natural resources by society to meet human needs; main categories and concepts of management in the field of ecology and economics of nature management; modern approaches to public administration in the field of nature management; provisions of normative-legal regulation in public administration in the field of nature management; criteria and indicators of efficient and rational use of natural resources; scientific principles of rational nature management; management tools and economic mechanism of rational nature management.

**Management of state and municipal lands.** The concept of state and municipal land, regulatory framework; mechanisms for managing land resources at the level of the state, region, district and territorial community; specifics of the use and management of the land plots on which the objects of communal property of territorial communities are located (objects of social infrastructure: kindergartens, schools, hospitals; plots under electric, transport, gas networks, cemeteries, landfills of municipal waste; sites under communal enterprises and institutions); reserve land; decision to grant land plots; electronic technologies in the field of management of state and municipal lands.

**Agrarian policy.** Mechanisms of formation of national and world agri-food markets, influence of agrarian policy on international trade and food security of the country; instruments for regulating agri-food markets and economic consequences of their application; basic approaches to assessing the level of state support for the agricultural sector; principles of agrarian-ecological, agrarian-social policy, their modern aspects and problems of realization; the main stages of development of agricultural policy in Ukraine and the main directions of modern agricultural policy of the state; the current state of the process of reforming economic relations in the agro-industrial complex of Ukraine, the characteristics of budget, tax, financial and credit and pricing policy; features of agricultural policy formation in countries with different levels of economic development.

**Regional governance and local self-government.** National regional policy: subjects of implementation, main goals and objectives; state strategy for regional

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development; state regional policy for sustainable development of Ukrainian territories; tasks and functions of local self-government bodies in state regulation of regional development at the current stage of the decentralization of power reform; organizational and legal basis for the formation of material, technical and financial-economic base; functioning of representative and executive bodies of local self-government; cooperation of local self-government bodies with state executive bodies, civil society institutions and business representatives.

**Public administration of innovation activity.** Theoretical and methodological bases of development and regulation of innovative activity; features of implementation of innovations; planning of measures for implementation of innovative projects; project implementation and monitoring; mechanisms of public innovation management; methods and instruments of state support of innovative activity; the need for state support for innovation; classification of state support instruments for innovation; areas of application of state influence on innovation processes; direct and indirect methods of promoting the development of innovative activity by the state; domestic experience in supporting innovative activity; the concept and content of regulation of innovation activity at different levels of public administration; foreign experience of supporting innovative development; monitoring of innovations in public authorities.

**Public finance management.** Content, basic concepts, principles, functions, approaches in the field of public finance management; budgetary policy of Ukraine; regulatory and legal regulation; powers of state and local governments in the area of budget and finance; peculiarities of implementation of intergovernmental budgetary relations; mechanisms and methods of attracting state and local borrowing, credit and investment resources for the needs of the territories; foreign experience in public finance management.

**Public governance.** Establishment, functioning and development of civil society; basic concepts in public administration; legal and regulatory support for the activities of civil society institutions; realization of citizens' right to participate in public administration; ensuring transparency of the activity of public authorities; the principle of accountability to public authorities; the content, forms and nature of the participation of civil society organizations in the process of forming and implementing public policy; organization and conducting of public examination of the activity of public authorities; planning and conducting public monitoring; state of development of civic governance in developed countries of the world.

**Legal regulation in separate spheres and branches of management.** Legal principles of state regulation of public relations in certain spheres and branches of public administration; definition of features, principles and functions of legal regulation; subjects and objects of legal regulation, their functions, powers and relationships; laws and regulations on legal regulation of the activities of public administration bodies in certain spheres and industries; preparation and harmonization of legal acts; Involvement of the public in management decisions on the legal regulation of certain spheres and branches of public administration.

**State anti-corruption policy.** The concept of corruption, its types, causes and consequences, corruption risks; the current paradigm of public policy for the prevention of corruption; legal bases of the state policy on prevention of corruption; international normative-legal acts against corruption, the system of current legislation in the sphere of combating and preventing corruption; international experience in combating and preventing corruption; the system of subjects of combating and preventing corruption, their functions and powers, new national legislation on combating and preventing corruption; implementation of anti-corruption reform; mechanisms for overcoming corruption in public authorities.

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**Quality management of public services.** Content of key concepts, classification, types of public services; client-oriented approach; conceptual foundations for building a service state; public policy in the field of public services; legal and regulatory support for the provision of services to public entities; provision of public services to individuals and legal entities through administrative service centers; organization and criteria for the provision of public services; standardization of public service delivery; mechanisms and tools for monitoring and improving the quality of public services; quality control of public services; information and communication and personnel support for the organization of public service provision; electronic services.

**HR management in public authorities.** Personnel policy; strategy of personnel management in public authorities; HR management and technologies; organization of recruitment and selection of personnel; organization of activity of personnel management service; formation of the collective of the organization; leadership and team building; staff performance appraisal; management of personnel development; efficiency of personnel management; professionalization of civil servants and officials of local self-government bodies; worldwide experience in HR management.

**Public administration in social and humanitarian sphere.** Content, principles, functions, subjects, objects, directions of social and humanitarian policy; main problems of social development of society; features of implementation of transformation processes in Ukraine; conceptual directions of public policy in planning and implementation of strategies, concepts and programs in social and humanitarian spheres; level and quality of life indicators; social security and population protection systems; criteria for evaluating the functioning of the social and humanitarian sphere; mechanisms, tools and technologies for the formation and implementation of social and humanitarian policies at all levels, mutual responsibility of the state and society.

**Public administration of municipal institutions.** Theoretical foundations and legislative support for the functioning of communal property establishments of territorial communities; features, mechanisms and tools of public administration and administration; planning of municipal property institutions; organization of activities and sources of financing; personnel and logistical support of municipal property institutions; organization of provision of services on a self-financing basis; quality of public service delivery; monitoring, evaluation and control over the provision of public services; cooperation of municipal property institutions with public authorities; crisis management; foreign experience of public management and administration.

**Management psychology and conflictology.** The role of human and psychological factors in public administration; optimal distribution of professional and social roles within the team; informal relationships between team members; psychological mechanisms of managerial decision making; social and psychological qualities of the head; psychological factors that determine the effectiveness of the team members; professional self-determination; search and activate the capacity of the organization's staff; formation and maintenance of organizational climate in public authorities; psychological methods of grouping staff around the organization's goals; methods of improving the style and culture of business relationships in public authorities; psychological compatibility of team members; methods of establishing effective interaction between subjects and objects of public administration; ability to prevent and resolve conflicts.

**Professional ethics in public administration.** The role and importance of ethics in public administration; professional ethics and professional morality; basic ethical principles, values and norms of ethics; regulatory and legal support for ethics of public servants; ethics of business communication; manager's track record; formation of ethical foundations of relations between public authorities and citizens; business and business etiquette in public administration; general rules of ethical behavior of civil servants and officials of local self-government; business and business etiquette in public administration; ethical aspects of professionalization of public servants.

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General editor  
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**MASTER CURRICULA  
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**2022-2023 academic year**

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