

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

**MASTER CURRICULA  
AND TRAINING PROGRAMS**

**2020-2021  
academic year**

**2020**

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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 and the veterinary faculty of Kiev Polytechnic Institute, 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.

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.

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 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

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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).

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.

Since 1936 the University has incorporated Boyarka Forest Research Station, since 1957 – training and research farm "Vorzel", since 1966 – Agronomic Research Station

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(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 Agrarian University.

According to the Resolution of the Cabinet of Ministers of Ukraine from 29 May 1997 № 526, Berezhany Agricultural College (Ternopil region), Zalizhchyky (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, Zalizhchyky 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 2010 it received the status of self-governing (autonomous) research national university.

Reforming of the university resulted in clear outline of its prospects - consolidation of training, research, innovation, information, advisory, educational and production activities. Thus, the achievements of the University testify that NULES of Ukraine is a prime example of the institution of the 21st century.



## 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 38 specialties covering 59 educational programs (58 educational and professional та 7 educational and research) (table 1)

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

| Structural subdivision<br>(ERI, faculty)              | Specialty  | Educational programs  |
|---|--|---|
| ERI of Energetics,<br>Automatics and Energy<br>Saving | Automation and Computer<br>Integrated Technologies                       | Automation and Computer Integrated<br>Technologies*                                       |
|   | Power Engineering, Electrical<br>Engineering and Electrical<br>Mechanics | Power Engineering, Electrical<br>Engineering and Electrical Mechanics*                    |
| ERI of Forestry and<br>Garden-Park Management         | Forestry   | Forestry*   |
|   | Woodworking and Furniture<br>Technologies                                | Woodworking and Furniture<br>Technologies*  |
|   | Park and Gardening<br>Management   | Park and Gardening Management*  |
| ERI of After Diploma<br>Education                     | Management   | Extension service*<br>Management of innovative activity*                                  |
|   | Public Management and<br>Administration                                  | Public Management and Administration**  |
| Agrobiology   | Agronomy   | Agronomy*   |
|   |  | Agrochemistry and Soil Science*   |
|   |  | Selection and genetics of agricultural<br>crops*  |
|   |  | Agrohimservice in precision agricultural<br>production*                                   |
|   | Horticulture and Viticulture   | Horticulture and Viticulture*   |
| Humanitarian Pedagogical                              | Management   | Management of educational institution*<br>Management of Human Resources                   |
|   |  | Pedagogy of higher school*<br>Information and communication<br>technologies in education* |
|   | Education and Educational<br>Science                                     | Social Work*  |
|   |  | Socio-psychological rehabilitation  |
|   | Social Work  | English and other foreign language  |
|   |  | German and other foreign language*  |
|   | Philology (german languages and<br>literature) (including translation)   | Psychology*   |
| Economic  | Psychology   | Economics of enterprise*<br>Applied Economics*  |
|   | Economy  | Accounting and audit*   |
|   | Accounting and Taxation  | Entrepreneurship, Trade and Exchange<br>Activities*                                       |
|   | Entrepreneurship, Trade and<br>Exchange Activities                       | Finance and credit*   |
|   | Finance, Banking and Insurance   | Agricultural Engineering  |
| Mechanics - Technology                                | Agricultural Engineering   | Motor Transport   |
|   | Motor Transport  | Transport technologies in road<br>transport   |
|   | Transport technologies (in road<br>transport)                            |   |

**MASTER CURRICULA AND TRAINING PROGRAMS**

| <b>Structural subdivision<br/>(ERI, faculty)</b>                    | <b>Specialty</b>  | <b>Educational programs</b>  |
|---|---|--|
| Agrarian Management   | Management  | Administrative management *  |
|   |   | Management of foreign economic activity *                              |
|   |   | Management of organization and administration *                        |
|   |   | Management of investment activity and international projects *         |
|   | 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*      |
|   |   | Nutritionology* (ERP)  |
| Law   | Law   | Law*   |

**Note:** \* persons who have basic higher education in any specialty are admitted;

\*\* persons who have full higher education in any specialty are admitted.

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;
- educational programs with cross entry opportunities (with additional entrance examination):



- 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.

Especially popular at the university are educational programs with cross entry opportunities (with additional entrance examination).

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.

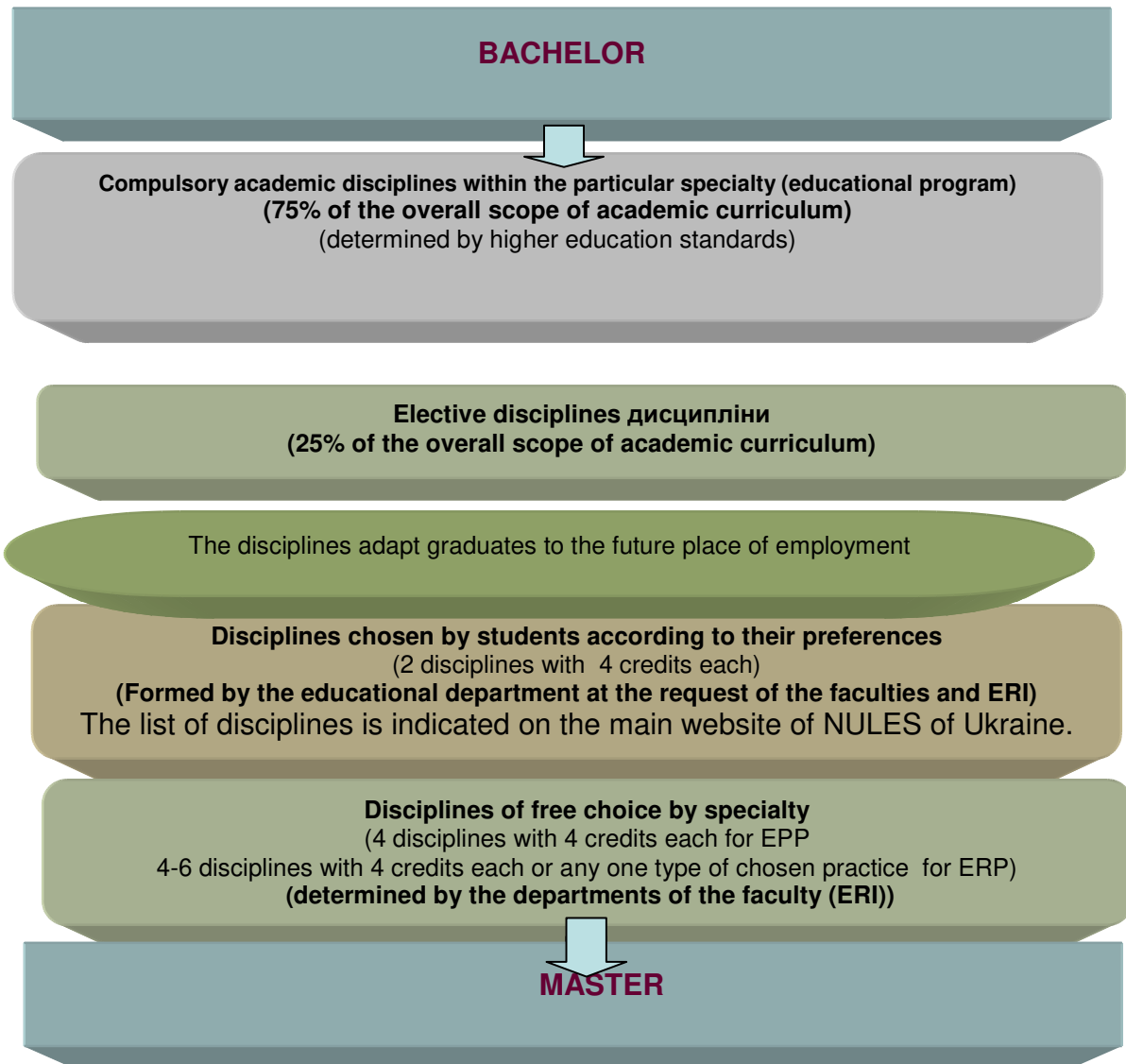


Fig. 1. The structure of the content of educational programs for Master's degree in NULES of Ukraine

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).

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.

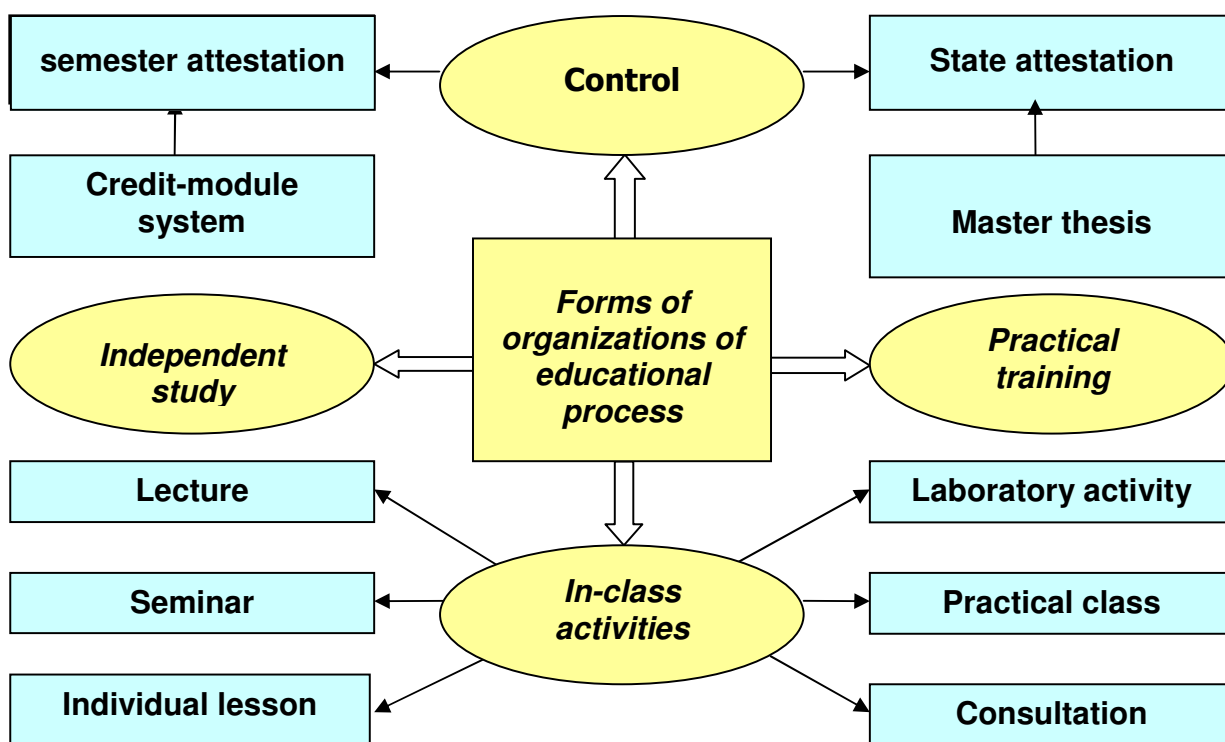


Fig. 2. The main form of implementation of educational process at NULES of Ukraine

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 "Zalischky 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.

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 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

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forms of the educational activities are carried out: in-class activities, independent study, practical training and control.

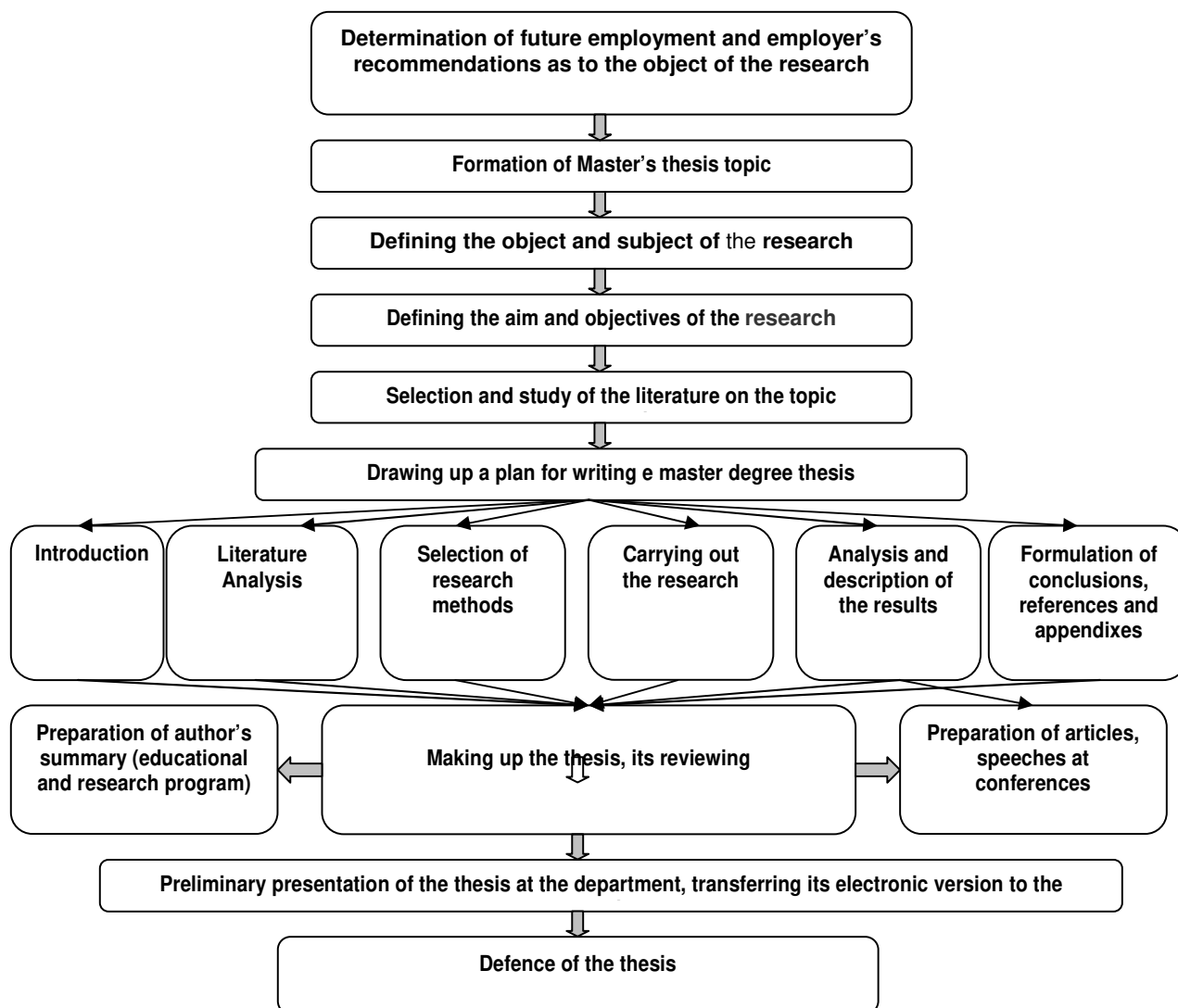


Fig. 3. Stages of writing Master thesis

## 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.

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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 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.
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Information and bibliographic department organizes and conducts:

- "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;
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Users are provided with:

- 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.

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The department has academic and scientific literature in:

- 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.
-

## INFORMATION AND TELECOMMUNICATION SUPPORT OF THE ACADEMIC PROCESS

The main objective of the university – to train highly qualified specialists for the agricultural sector with up-to-date computer knowledge and skills. In order to make efficient use of ICT in the educational process at NULES of Ukraine, a corporate information-educational environment (IEE) has been set up. It includes the following components: well-developed computer infrastructure, software platforms, information and educational resources and a system of IEE management. The university educational cluster functions on cloud-based technologies, and is integrated with MS O365 and Google, where the university has corporate accounts and unified state electronic database on education (USEDE). Hybrid cloud-oriented educational environment of the university has internal resources - educational information portal (platform Moodle), institutional repository (ePrints), video portal, video-conferencing system, conference support system, etc., as well as external resources - Google and Microsoft O365 services to organize teamwork, academic portals Microsoft and Cisco etc. (Figure 4).

The University infrastructure provides students with an access to information and educational resources. On average, there is one computer per 3.4 students at the University. By the end of 2015 the university information system had 3000 computers. They are supported by servers with the licensed software, including licensed Microsoft Enrollment for Education Solutions. All educational buildings and student residence buildings are connected to the Local Area Network (LAN) with a bandwidth of 1 Gbps in each direction, and there is also a local Wi-Fi network with free access to the Internet.

A web system LDAP Account Manager is used to administer a unified base of users. The Centre of distance learning technologies provided the Ukrainian localization for this system and integrated it into the unified state education base (USEB).

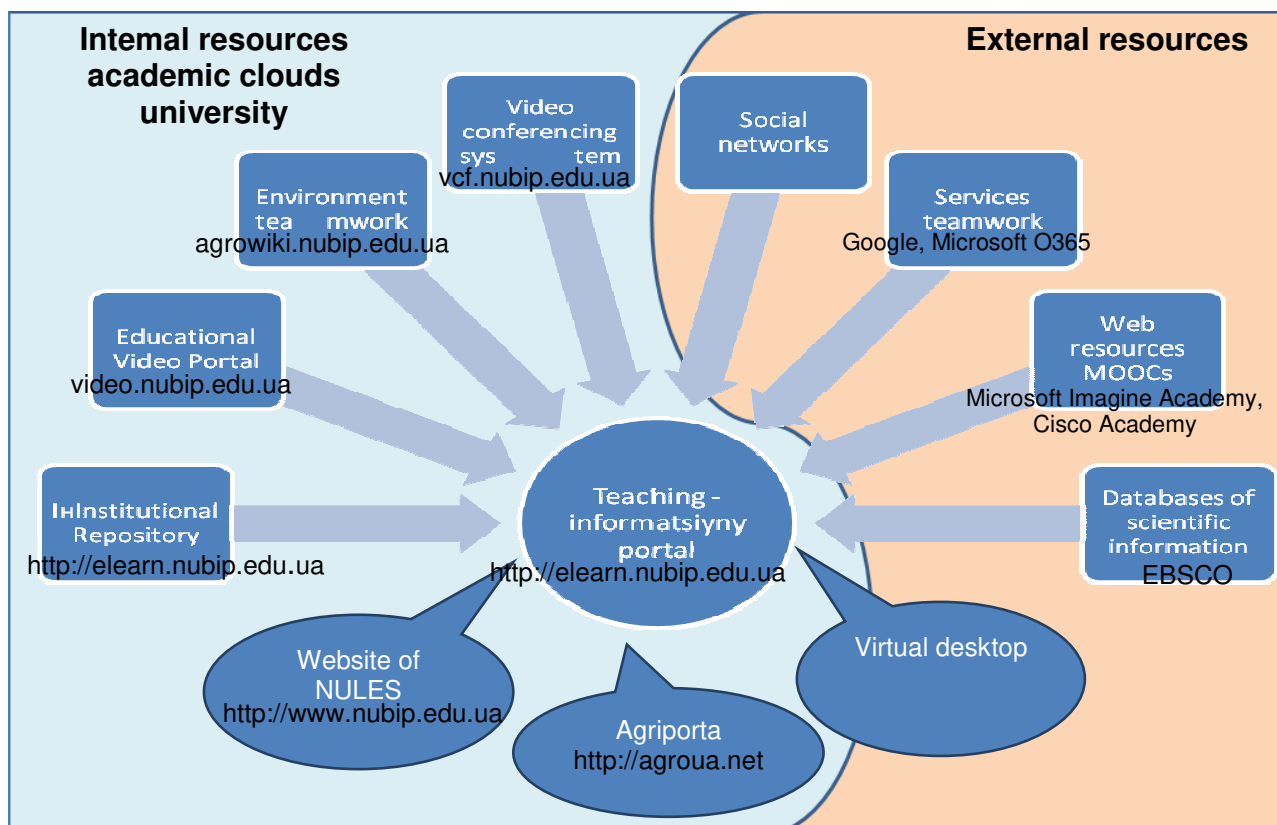


Fig. 4. Hybrid cloud-oriented educational environment at NULES of Ukraine

To support teaching activities in information-educational environment the university makes use of the following software platforms:

- Learning and Information Portal ([elearn.nubip.edu.ua](http://elearn.nubip.edu.ua)), which contains e-learning courses (ELC) for students at 13 faculties and 3 educational and research institutes. Each academic discipline is supported by e-course with theoretical material and resources for laboratory and practical work, independent work, formative, interim and final control. University experts have developed a standard structure of ELC, its certification, as well as training system for teaching personnel to develop such e-courses;
- electronic dean's office management system;
- an electronic archive of scientific and educational materials ([elibrary.nubip.edu.ua](http://elibrary.nubip.edu.ua)), which includes electronic copies of papers of the university lecturers, proceedings of the conferences held at the University, abstracts of theses defended at NULESU, Masters' scientific papers and theses, books and teaching guidelines to support the learning process, a description of open e-learning courses, patents;
- Wikiportal ([agrowiki.nubip.edu.ua](http://agrowiki.nubip.edu.ua)), where scholars, educators and students place thematic articles on the problems of research, standards (Codex Alimentarius, ISO, JMA, BS), portfolios;
- Video Portal ([video.nubip.edu.ua](http://video.nubip.edu.ua)), which houses educational videos, video lectures and other video resources produced at the University and used in training, educational and cultural activities;
- Library repository on DSpace platform ;
- Web-platform for Internet-conferences at NULES of Ukraine on Openconference basis. Internet-conference address is [econference.nubip.edu.ua](http://econference.nubip.edu.ua);
- on-line system UNPLAG to verify students' thesis and course papers, scientific and educational literature written by university teaching staff for plagiarism detection in text.

In the field of information and computer training, the University maintains cooperation with Ukrainian and foreign IT companies — IBM, Microsoft, Intel Cisco, 1C, CyberBionicSystematics etc. There are educational laboratories: "1C competence centre", "Microsoft Imagine Academy", "Cisco Academy". To provide students and faculty access to International full-text publications the university subscribed to Scientometrics EBSCO database.

The university closely cooperates with regional educational institutions using the technologies provided by information and educational environment of NULESU. In particular, the university teachers give video lectures to students at the separated subdivisions: "Mukacheve Agricultural College", "Bobrovytsia College of Economics and Management named after O. Mainova", "Zalishchyky Agricultural College named after Ye. Khraplyvy", "Berezhany Agrotechnical Institute", "Irpın Economic College", "Nizhyn Agrotechnical Institute". In 2015, the international conferences held at NULESU were provided with video reports of some foreign participants from their countries (Poland, Great Britain, the Netherlands etc).



## **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.

During this period more than 3000 foreign students from 91 countries have graduated with master degrees in various fields. More than 500 of them continued their education as postgraduates and doctoral students and have obtained scientific degrees of doctors and candidates of sciences.

At present, NULESU maintains contacts and cooperates with 129 organisations from 40 countries in the framework of partnership agreements.

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 2018, 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;
- "Quality and safety of products", "Management" and "Computer technologies" - Academy of business (Dombrova Gurnica, Poland);
- "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.

International mobility in NULES of Ukraine is one of the leading areas of international activity, which offers its students the exceptional opportunities to obtain quality education, do research or internship, and get experience abroad in the framework of international cooperation. Developing the mobility through the implementation of the mechanism of student exchange and participation in the dual diploma programs, individual grants, the University participates in the processes of internationalization and globalization, develops the training of professionals, highly qualified specialists; supports the social, economic, cultural, political relations and ties with other countries.

Today, motivated students of our University can get the experience in conditions of different system of higher education. Cooperation is based on agreements between NULES of Ukraine and foreign higher educational institutions in different countries according to agreed and approved individual educational plans of students and programs of academic disciplines, and in the framework of intergovernmental agreements on cooperation in the field of education.

Every year in NULES of Ukraine:

- about 200 students do training and internship at overseas universities;

- about 1000 students have practical training at the leading agricultural enterprises in different countries;

- over 200 lecturers do internship in foreign institutions train, establish cooperation and represent the university in international events.

Over the last 5 years (from 2013 to 2018) 7420 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 the activities of the Visegrad University Association;
- participation in MAGATE Agency activities and meetings of experts on nuclear safety in Fukushima-Chernobyl;

- participation in the activities of the Ukrainian-American Commission on investment and trade;

- participation in joint research projects HORIZON-2020, ERASMUS+, GESAPU, MIMIPPA, SOCODEVI 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.

## **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", IQ tests, Olympiads among students in new sports, such as paintball, pushups, volleyball on the ground and many others.

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.

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

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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.

### **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".

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.

## ADMISSION TO MASTER DEGREE COURSE AT NULES OF UKRAINE

Admission to Master degree course is either state-subsidized (by state order) or sponsored by physical or legal entities under the terms of contract. Persons who obtained Bachelor's or Master's degree (an educational qualification level of a specialist) in accordance with the requirements approved by the Rules of admission for Master degree course at NULES of Ukraine can apply for "Master's degree" programs.

Applicants are admitted for a Master's degree program at NULES of Ukraine on the basis of acquired Bachelor's or Master's degree and an educational qualification level of a specialist in another specialty (major), providing they succeeded in passing additional entrance examinations, and taking into account the average score of the corresponding appendix to the diploma. Options for combining specialties in different branches of knowledge are given in tables 2, 3, 4.

**Table 2.** Specialties for persons with bachelor's degree applying for the educational degree "Master" with related specialty

| Related Specialties (majors) of educational degree "Bachelor" |          | Specialties (educational programs) of educational degree "Master" |  |
|---|----------|---|--|
| title   | code     | code  | title  |
| Philology   | 035      | 035.041   | Philology (german languages and literature) (including translation), the first one is english) (English and other foreign language))   |
| Philology   | 6.020303 |   |  |
| Philology   | 035      | 035.043   | Philology (german languages and literature) (including translation), the first one is english) (English and other foreign language))   |
| Philology   | 6.020303 |   |  |
| Economic  | 051      | 051   | Economy (Economics of enterprise)<br>Economy (Economic cybernetics)<br>Economy (Applied economics)   |
| Economic theory   | 6.030501 |   |  |
| Economic cybernetics  | 6.030502 |   |  |
| International economics                                       | 6.030503 |   |  |
| Economics of enterprise                                       | 6.030504 |   |  |
| Human resources management and labour economics               | 6.030505 |   |  |
| Applied statistics  | 6.030506 |   |  |
| Psychology  | 053      | 053   | Psychology   |
| Accounting and Taxation                                       | 071      | 071   | Accounting and Taxation (Accounting and audit)   |
| Finance and credit  | 6.030508 |   |  |
| Accounting and audit  | 6.030509 | 072   | Finance, Banking and Insurance (Finance and credit)  |
| Finance, Banking and Insurance                                | 072      |   |  |
| Finance, Banking and Insurance                                | 6.030508 | 073   | Management (Management of organization and administration)<br>Management (Management of foreign economic activity)<br>Management (Administrative management)<br>Management (Management of investment activity and international projects)<br>Management (Management of innovative activity)<br>Management (Management of educational institution)<br>Management (Extension service)<br>Management (Personnel management) |
| Management  | 073      |   |  |
| Human resources management and labour economics               | 6.030505 |   |  |
| Management  | 6.030601 |   |  |
| Marketing   | 075      | 075   |  |

**MASTER CURRICULA AND TRAINING PROGRAMS**

| Related Specialties (majors) of educational degree "Bachelor"      |          | Specialties (educational programs) of educational degree "Master" |  |
|--|----------|---|--|
| title  | code     | code  | title  |
| Marketing  | 6.030507 |   | Marketing  |
| Entrepreneurship, trade and exchange activities                    | 076      | 076   | Entrepreneurship, trade and exchange activities  |
| Economics of enterprise  | 6.030504 |   |  |
| Human resources management and labour economics                    | 6.030505 |   |  |
| Marketing  | 6.030507 |   |  |
| Merchandising and commercial entrepreneurship                      | 6.030510 |   |  |
| Geodesy and land management  | 6.080101 |   |  |
| Consumer services  | 6.140102 |   |  |
| Law  | 081      | 081   | Law  |
| Law science  | 6.030401 |   |  |
| Ecology  | 101      | 101   | Ecology (Ecological control and audit)   |
| Ecology, environmental protection and sustainable development      | 6.040106 |   | Ecology (Ecological control and audit)   |
| Software engineering   | 121      | 121   | Software engineering (Information Systems Software)  |
| Computer sciences  | 6.050101 |   |  |
| Computer engineering   | 6.050102 |   |  |
| Program engineering  | 6.050103 |   |  |
| Computer science   | 122      | 122   | Computer science (Information managing systems and technologies)<br>Computer science (Computer ecological and economic monitoring) |
| Computer sciences  | 6.050101 |   |  |
| Computer engineering   | 6.050102 |   |  |
| Program engineering  | 6.050103 |   |  |
| Computer engineering   | 123      | 123   | Computer engineering (Computer systems and networks)   |
| Computer sciences  | 6.050101 |   |  |
| Computer engineering   | 6.050102 |   |  |
| Program engineering  | 6.050103 |   |  |
| Industrial mechanical engineering                                  | 133      | 133   | Industrial mechanical engineering (Machinery and equipment of agricultural production)   |
| Mechanical engineering   | 6.050503 |   | Industrial mechanical engineering (Equipment of forest complex)  |
|  |          |   | Industrial engineering (Technical service of machines and equipment of agricultural production)                                    |
| Power engineering, electrical engineering and electrical mechanics | 141      | 141   | Power engineering, electrical engineering and electrical mechanics   |
| Electrical engineering and electrical technologies                 | 6.050701 |   |  |
| Electrical mechanics   | 6.050702 |   |  |
| Energetics and electrotechnical systems in agroindustrial complex  | 6.100101 |   |  |
| Automation and computer integrated technologies                    | 151      | 151   | Automation and computer integrated technologies  |
| Systems engineering  | 6.050201 |   |  |
| Automation and computer integrated technologies                    | 6.050202 |   |  |
| Networks and systems of postal services                            | 6.050904 |   |  |
| Instrument engineering   | 6.051003 |   |  |



**MASTER CURRICULA AND TRAINING PROGRAMS**

| Related Specialties (majors) of educational degree "Bachelor" |          | Specialties (educational programs) of educational degree "Master" |  |
|---|----------|---|--|
| title   | code     | code  | title  |
| Metrology and information and measurement technique           | 152      | 152   | Metrology and information and measurement technique (Quality, standardization and certification) |
| Metrology and information and measurement technique           | 6.051001 |   |  |
| Metrology, Standardization and Certification                  | 6.051002 |   |  |
| Instrument engineering  | 6.051003 |   |  |
| Optoelectronics   | 6.051004 |   |  |
| Biotechnology and bioengineering                              | 162      | 162   | Biotechnology and bioengineering (Environmental biotechnology and bioenergetics)                 |
| Biotechnology   | 6.051401 |   |  |
| Food technologies   | 181      | 181   | Food technologies (Technologies of storage, preserving and reprocessing of meat)                 |
| Food technologies and engineering                             | 6.051701 |   | Food technologies (Technologies of storage, preserving and reprocessing of meat)                 |
| Technological expertise and safety of food products           | 6.051702 |   | Food technologies (Nutritionology)   |
|   |          |   |  |
| Woodworking and furniture technologies                        | 187      | 187   | Woodworking and furniture technologies   |
| Woodworking and furniture technologies                        | 6.051801 |   |  |
| Construction and civil engineering                            | 192      | 192   | Construction and civil engineering   |
| Construction  | 6.060101 |   |  |
| Hydrotechnics (water resources)                               | 6.060103 |   |  |
| Geodesy and land management                                   | 193      | 193   | Geodesy and land management  |
| Geodesy, cartography and land management                      | 6.080101 |   |  |
| Agronomy  | 201      | 201   | Agronomy (Agronomy)  |
| Agronomy  | 6.090101 |   | Agronomy (Agrochemistry and soil science)  |
|   |          |   | Agronomy (Selection and genetics of agricultural crops)  |
|   |          |   | Agronomy (Agrohimservice in precision agricultural production)                                   |
| Plant protection and plant quarantine                         | 202      | 202   | Plant protection and plant quarantine (Plant protection)   |
| Plant protection  | 6.090105 |   | Plant protection and plant quarantine (Quarantine of plants)                                     |
| Horticulture and viticulture                                  | 203      | 203   | Horticulture and viticulture   |
| Agronomy  | 6.090101 |   |  |
| Technology of production and processing of livestock products | 204      | 204   | Technology of production and processing of livestock products                                    |
| Technology of production and processing of livestock products | 6.090102 |   |  |
| Forestry  | 205      | 205   | Forestry   |
| Forestry, park and gardening management                       | 6.090103 |   |  |
| Lumbering   | 6.090104 |   |  |
| Park and gardening management                                 | 206      | 206   | Park and gardening management  |

**MASTER CURRICULA AND TRAINING PROGRAMS**

| <b>Related Specialties (majors) of educational degree "Bachelor"</b>                  |             | <b>Specialties (educational programs) of educational degree "Master"</b> |   |
|---|-------------|--|---|
| <b>title</b>  | <b>code</b> | <b>code</b>  | <b>title</b>  |
| Forestry, park and gardening management   | 6.090103    |  |   |
| Park and gardening management   | 207         | 207  | Park and gardening management   |
| Water bioresources and aquaculture  | 6.090201    |  |   |
| Agricultural engineering  | 208         | 208  | Agricultural engineering  |
| Processes, machinery and equipment of agroindustrial production                       | 6.100102    |  |   |
| Veterinary medicine   | 211         | 211  | Veterinary medicine   |
| Veterinary medicine   | 6.110101    |  |   |
| Veterinary hygiene, sanitary and expertise  | 212         | 212  | Veterinary hygiene, sanitary and expertise  |
| Veterinary medicine   | 6.110101    |  |   |
| Social work   | 231         | 231  | Social work (Social work; Socio-psychological rehabilitation)                         |
| Social pedagogy   | 6.010106    |  |   |
| Social work   | 6.130102    |  |   |
| Motor Transport   | 274         | 274  | Motor Transport   |
| Transport technologies (types of transport)   | 6.070101    |  |   |
| Motor Transport   | 6.070106    |  |   |
| Transport technologies (in road transport) (Transport technologies in road transport) | 275.03      | 275.03   | Transport technologies (in road transport) (Transport technologies in road transport) |
| Transport technologies (types of transport)   | 6.070101    |  |   |

**Table 3.** Specialties for persons with bachelor's degree applying for the educational degree "Master" in the other (non-related) specialty

| <b>Non-related Specialties (majors) of educational degree "Bachelor"</b> |             | <b>Specialties (educational programs) of educational degree "Master"</b> |  |
|--|-------------|--|--|
| <b>title</b>   | <b>code</b> | <b>code</b>  | <b>title</b>   |
| Other specialties (majors)   |             | 011  | Education and Educational Science (Pedagogy of higher school; Information and communication technologies in education) |
| Other specialties (majors)   |             | 035.041  | Philology (German language and literature) (including translation) (English and other foreign language)                |
|  |             | 035.043  | Philology (German language and literature) (including translation) (German and other foreign language)                 |
| Other specialties (majors)   |             | 051  | Economics (Economics of enterprise, Applied Economics; Economic cybernetics)   |
| Other specialties (majors)   |             | 053  | Psychology   |
| Other specialties (majors)   |             | 071  | Accounting and Taxation (Accounting and audit)   |
| Other specialties (majors)   |             | 072  | Finance, Banking and Insurance (Finance and credit)  |
| Other specialties (majors)   |             | 073  | Management (Management of organization and administration) Management (Management of foreign                           |

**MASTER CURRICULA AND TRAINING PROGRAMS**

| <b>Non-related Specialties (majors) of educational degree "Bachelor"</b> |             | <b>Specialties (educational programs) of educational degree "Master"</b> |   |
|--|-------------|--|---|
| <b>title</b>   | <b>code</b> | <b>code</b>  | <b>title</b>  |
|  |             |  | economic activity)<br>Management (Administrative management)<br>Management (Management of investment activity and international projects)<br>Management (Management of innovative activity)<br>Management (Management of educational institution)<br>Management (Management of Human Resources)<br>Management (Extension service) |
| Other specialties (majors)   |             | 075  | Marketing   |
| Other specialties (majors)   |             | 076  | Entrepreneurship, Trade and Exchange Activities   |
| Other specialties (majors)   |             | 081  | Law   |
| Other specialties (majors)   |             | 101  | Ecology (Ecological control and audit; Ecology and environmental protection)  |
| Other specialties (majors)   |             | 121  | Software Engineering (Information Systems Software)   |
| Other specialties (majors)   |             | 122  | Computer Science (Information managing systems and technologies; Computer ecological and economic monitoring)   |
| Other specialties (majors)   |             | 123  | Computer Engineering (Computer systems and networks)  |
| Other specialties (majors)   |             | 133  | Industrial Mechanical Engineering (Machinery and equipment of agricultural production; Equipment of forest complex; Technical service of machines and equipment of agricultural production)   |
| Other specialties (majors)   |             | 141  | Power Engineering, Electrical Engineering and Electrical Mechanics  |
| Other specialties (majors)   |             | 151  | Automation and Computer Integrated Technologies   |
| Other specialties (majors)   |             | 152  | Metrology and Information and Measurement Technique (Quality, Standardization and Certification)  |
| Other specialties (majors)   |             | 162  | Biotechnology and Bioengineering (Environmental biotechnology and bioenergetics)  |
| Other specialties (majors)   |             | 181  | Food Technologies (Technologies of storage, preserving and reprocessing of meat; Technologies of storage and reprocessing of aquatic bioresources; Nutrition science)   |
| Other specialties (majors)   |             | 187  | Wood processing and Furniture Technologies  |
| Other specialties (majors)   |             | 192  | Construction and Civil Engineering  |
| Other specialties (majors)   |             | 193  | Geodesy and Land Management   |
| Other specialties (majors)   |             | 201  | Agronomy (Agronomy; Agrochemistry and Soil Science; Selection and genetics of agricultural crops,   |

| <b>Non-related Specialties (majors) of educational degree "Bachelor"</b> |             | <b>Specialties (educational programs) of educational degree "Master"</b> |   |
|--|-------------|--|---|
| <b>title</b>   | <b>code</b> | <b>code</b>  | <b>title</b>  |
|  |             |  | Agrochemical service in precision agricultural production)                          |
| Other specialties (majors)   |             | 202  | Plant Protection and Plant Quarantine (Plant Protection; Quarantine of Plants)      |
| Other specialties (majors)   |             | 203  | Horticulture and Viticulture  |
| Other specialties (majors)   |             | 204  | Technology of Production and Processing of Livestock Products                       |
| Other specialties (majors)   |             | 205  | Forestry  |
| Other specialties (majors)   |             | 206  | Park and Gardening Management   |
| Other specialties (majors)   |             | 207  | Water Bioresources and Aquaculture  |
| Applied mechanics  | 131         | 208  | Agricultural Engineering  |
| Industrial Mechanical Engineering  | 133         |  |   |
| Power Engineering, Electrical Engineering and Electrical Mechanics       | 141         |  |   |
| Power engineering  | 142         |  |   |
| Transport technologies (in road transport)                               | 275         |  |   |
| Energetics and electrotechnical systems in agroindustrial complex        | 6.100101    |  |   |
| Mechanical engineering   | 6.050503    |  |   |
| Transport technologies   | 6.070101    |  |   |
| Other specialties (majors)   |             | 231  | Social Work (Social Work; Socio-psychological rehabilitation)                       |
| Applied mechanics  | 131         | 274  | Motor Transport   |
| Industrial Mechanical Engineering  | 133         |  |   |
| Power engineering  | 142         |  |   |
| Agricultural Engineering   | 208         |  |   |
| Mechanical engineering   | 6.050503    |  |   |
| Processes, machinery and equipment of agroindustrial production          | 6.100102    |  |   |
| Applied mechanics  | 131         | 275.03   | Transport technologies (in road transport) Transport technologies in road transport |
| Industrial Mechanical Engineering  | 133         |  |   |
| Power engineering  | 142         |  |   |
| Agricultural Engineering   | 208         |  |   |
| Motor Transport  | 274         |  |   |
| Mechanical engineering   | 6.050503    |  |   |
| Motor transport  | 6.070106    |  |   |
| Processes, machinery and equipment of agroindustrial production          | 6.100102    |  |   |

**Table 4.** Specialties for persons with Master's degree or education qualificational level "Specialist" applying for the educational degree "Master" in other (non-related) specialty

| <b>Non-related Specialties of EQL "Specialist" of educational degree "Master"</b> |             | <b>Specialties (educational programs) of educational degree "Master"</b> |  |
|---|-------------|--|--|
| <b>title</b>  | <b>code</b> | <b>title</b>   |  |
| Other specialties   | 051         | Economics (Economics of enterprise                                       |  |
| Other specialties   | 071         | Accounting and taxation (Accounting and audit)                           |  |
| Other specialties   | 193         | Geodesy and land management  |  |
| Other specialties   | 205         | Forestry   |  |
| Other specialties   | 206         | Park and gardening management  |  |

## **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 A. D. Balaev.  
Tel.: (044) 527-81-02  
E-mail: bal\_grunt@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](mailto:grunt_nubip@ukr.net)

Head of department – Doctor of Agricultural Sciences, Professor A. D. Balaev.

***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](mailto: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](mailto: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](mailto: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: [quality\\_chair@mail.ru](mailto:quality_chair@mail.ru)

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](mailto: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](mailto: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: [ovoichi.z@i.ua](mailto:ovoichi.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                                      | 98                          |
| – Part-time                                      | 60                          |
| Duration of Training:                            |                             |
| – Full-time educational and professional program | 1,5 years                   |
| – Part-time                                      | 1,5 years                   |
| Credits ECTS:                                    |                             |
| – educational and professional program           | 90                          |
| Language of Teaching                             | Ukrainian, English          |
| Qualification                                    | Agronomist-researcher       |

**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**

***Optional Block "The modern farming systems"***

The objects of study and research during the educational process should be agro landscapes, agrophytocenoses, soil, material and technical means of implementation of agricultural technologies. The subjects of study are the methods of land use, the structure of agroecosystems, farming systems, soil regimes, individual components of the farming systems (crop rotation, soil tillage, fertilizers, protection of soil from erosion), plant growth and development, technology of cultivation of cultural plants, quality of crop production; economic, energy and environmental efficiency of cultivation, processing and storage of plant products. Learning technologies of field forage crops in the current market conditions.

**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.

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### ***Optional Block "Adaptive crop"***

Production of cereal crops provides studying of field crops forms diversity, peculiarities in its biology and physiology, extension of cereal crops species set that are suitable for cultivation in certain soil-climatic zones, technologies of field crops cultivation, standards on obtained products quality, regularities of yield quality and quantity formation, development and improvement of technological elements to obtain high, sustain, economically valuable and environmentally friendly yields with high quality in zonal and varietal aspects, economy, marketing and management of crop production.

Implementation of these tasks is possible with the introduction of adaptive systems of agriculture, which contributes to masters knowledge and skills of the scientific bases of farming systems adapted to the relevant environmental conditions. The main constituents of adaptive farming systems is the scientific basis of rational crop rotation, tillage systems, resource saving and erosion control measures. Disclosure adaptive cost-effective, environmentally safe technologies of unconventional forage crops.

### **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.

### ***Optional Block "Production and logistics plant products"***

Program in forming future professionals need ensuring maximum agricultural crops factors for growth and development for the harvest of a certain quality. This provides by disciplines of master program that give knowledge influence of growing of each factor on the quality of grain, potato, vegetables; influence terms of harvesting and other logistics processes (handling, storage, primary processing) in the commodity, food and biological value of each type of crop products - intended for use in both fresh and processed form. The program provides theoretical basis to equip students with the basic components of agriculture, namely crop rotation systems, mechanical cultivation, fertilization systems, integrated crop protection from pests (weeds, pests and diseases) systems, erosion control measures and agri-environmental measures on contamination of soil, environment and agricultural products. Cultivation of forage crops for seed adaptive cost-effective, environmentally friendly technologies.

### **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.

### ***Optional Block "Energy-saving technologies in crop and forage production"***

The program provides theoretical basis to equip students with the basic components of agriculture, namely crop rotation systems, mechanical cultivation, fertilization systems, integrated crop protection from pests (weeds, pests and diseases) systems, erosion control measures and agri-environmental measures on contamination of soil, environment and agricultural products. The problems of modern energy saving technologies to create high-performance mixtures of natural forage lands and the formation of high yields, fodder crops on arable land with the least cost. Identifies competitive model capable of growing technology. Mastering saving technologies give students the opportunity to get environmentally safe products from plant material. Along with improving the quality of products reduced energy consumption in its production. Solve environmental problems and emissions to the environment.

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### 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 after O. Musichenko" and leading agricultural firms different forms, educational-scientific laboratories of NULES departments and some scientific-research organization of NAAS and NAS of Ukraine.

### Proposed Topics for Master Theses

1. Features of formation of species composition and patterns of germination of weeds in crops agroecosystems.
2. Change in soil fertility and efficiency of growing crops under different farming systems.
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 possibility 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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 1  | Methodology and organization of scientific research on the basics of intellectual property                           | 5                 | exam              |
| CC 2  | Biometrics   | 6                 | exam              |
| CC 3  | Management of risk factors in agriculture  | 5                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 4                 | exam              |
| OB 2  | Optional subject 2   | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 4  | Modern agricultural systems  | 7                 | exam              |
| CC 5  | Innovative technologies in plant science   | 7                 | 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 6   | Technological audit of storage and processing of crop products  | 6                        | exam                     |
| CC 7   | Modeling of productivity of forage crops  | 5                        | exam                     |
| CC 8   | Logistics and innovation of postharvest handling, storage and processing of crop products                                   | 5                        | exam                     |
| CC 9   | Energy-saving technologies in forage production   | 6                        | exam                     |
| <b>Optional components of EPP</b>  |   |                          |                          |
| <i>Optional Block by specialty</i>   |   |                          |                          |
| <i>Optional Block 1 "The modern farming systems"</i>                               |   |                          |                          |
| OB 1.1   | The adaptive farming systems  | 4                        | exam                     |
| OB 1.2   | Integrated pest control in modern farming systems   | 3                        | exam                     |
| OB 1.3   | Features of growing crops technologies in the current farming systems   | 3                        | exam                     |
| OB 1.4   | Quality and logistics crop production in modern farming systems   | 3                        | exam                     |
| OB 1.5   | Intensive cultivation technology of forage crops for seed   | 3                        | exam                     |
| <i>Optional Block 2 "Adaptive crop"</i>  |   |                          |                          |
| OB 2.1   | Adaptive technologies in Plant Growing  | 3                        | exam                     |
| OB 2.2   | Seed knowledge of field crops   | 3                        | exam                     |
| OB 2.3   | Energetic plant resources   | 2                        | exam                     |
| OB 2.4   | Certification and commodity of crop-growing products  | 3                        | exam                     |
| OB 2.5   | Crop rotations and tillage in modern farming  | 3                        | exam                     |
| OB 2.6   | Modern technologies of unconventional forage crops  | 2                        | exam                     |
| <i>Optional Block 3 "Production and logistics plant products"</i>                  |   |                          |                          |
| OB 3.1   | The adaptive farming systems  | 3                        | exam                     |
| OB 3.2   | Technology seeds and planting material of crops production  | 3                        | exam                     |
| OB 3.3   | Technology and chemical control of crop production  | 4                        | exam                     |
| OB 3.4   | Material and technical base of crop production logistics  | 3                        | exam                     |
| OB 3.5   | Innovative technologies in fodder production  | 3                        | exam                     |
| <i>Optional Block 4 "Energy-saving technologies in crop and forage production"</i> |   |                          |                          |
| OB 4.1   | Crop rotation and tillage in modern farming   | 3                        | exam                     |
| OB 4.2   | Prognosing and programming of yields field crops  | 3                        | exam                     |
| OB 4.3   | Intensive cultivation technology of forage crops for seed   | 3                        | exam                     |
| OB 4.4   | Energy-saving technologies in the branch of storage and processing  | 3                        | exam                     |
| OB 4.5   | Natural grasslands in increasing the production of complete feed  | 4                        | exam                     |
| <b>The total amount of compulsory components</b>                                   |   | <b>52</b>                |                          |
| <b>The total amount of optional components</b>                                     |   | <b>24</b>                |                          |
| <b>3. OTHER TYPES OF TRAINING</b>  |   |                          |                          |
| CC 10  | Preparation and defense of master's work  | 4                        |                          |
| CC 11  | Production Practice   | 10                       |                          |
| <b>THE TOTAL AMOUNT OF EPP</b>   |   | <b>90</b>                |                          |

**Annotations of subjects in the curriculum**

**1. 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.

## 2. 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.

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**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 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**

#### *Optional Block by specialty*

#### *Optional Block 1 "The modern farming systems"*

**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, 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

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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.

**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.

**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.

**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.

**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.

### ***Optional Block 2 "Adaptive crop"***

**Adaptive technologies in Plant Growing.** The discipline involves formation of complex knowledge about specific reactions of species, varieties and hybrids of plants on

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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 agroecosis 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 agroecosis. Model of plant and agroecosis 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 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.

**Seed knowledge of field crops.** The course is aimed at mastering by future professionals theoretical and practical skills for improving sowing qualities and yielding properties of seeds of field crops by optimizing of elements modern cultivation technologies, including using of plant growth regulators, micronutrients and biologics in combination with effective measures of chemical protection of plants and seeds. Study ways of accelerated breeding and seed improvement through chemical, biological and physical factors. Great attention is paid to the causes of injury seeds of field crops, different quality of seeds and its importance in seed producing practice; thermal stability during thermal disinfection of seeds; methods of pre-seed preparing. Study vitality and longevity of seeds during storage, depending from methods of harvesting, processing and postharvest conditions of storage also. Considers problems of integration national seed certification system to international standards; Supervision and monitoring a compliance entities of legislative requirements to manufacture, use, storage, sale and breeding of seeds and planting material of plant varieties during their commercial reproduction and circulation. Students are introduced with worldwide schemes of varietal seed certification, intended for international trade under "OECD seed schemes", which is now integrated in Ukraine, contemporary national and international legislative and regulatory framework of seeds and planting material. We study the basis of formation and operation of the seed market in the world and in Ukraine, current status, trends and directions of development, especially domestic and foreign pricing for seed crops. Much attention is paid to mastering

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by techniques of analysis seeds sowing qualities and planting material in accordance with applicable standards UNSS, SUC, ISO and new harmonized with the international requirements (ISTA, CEN, OECD, ISO) regulations.

**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.

**Certification and commodity of crop-growing products.** The course includes the study of the following issues: introduction to world development certification, basic terms and definitions in the field of certification types and system certification, the main provisions of the state certification system, the procedure of certification of products, certification of crop production. The subject teaches the order of conclusion and performance of contracts for grain, vegetables, potato, technical materials, requirements of commodity levels of main grains for different purpose. Teaches techniques by which determine the identity of commodity products to a particular class of grain, class of vegetables and fruit. Consider techniques to determine standardization of sugar beet, raw flax numbering. Teaches the rules of settlement realized grain, raw oilseed, potato tubers of different purpose, vegetables, pome fruit, stone fruit and berries. Teaches basic regulations concerning implementation of commodity grain, vegetable and industrial raw materials.

**Crop rotations and tillage in modern farming** Lectures on discipline covers the theoretical foundations of rotation; crop rotations in different natural and economic conditions and their practical application in Ukraine; intermediate crops in crop rotation and justify their possible use; implementation and development of crop rotation; application features short rotational crop rotations and practical recommendations transformation capabilities in multiple-rotation short rotation; practical application of crop rotation on crop rotation just in time. Highlights scientific basis of resource saving technologies of mechanical tillage and their practical application in different soil and climatic zones of Ukraine; the theoretical foundations of cultivation; basic theoretical principles of scientific and practical value farming systems: their historical development; solutions to expanded reproduction of soil fertility; sustainable land use, protection against erosion and obtaining high stable yields of crops in different soil and climatic zones of Ukraine.

**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.

***Optional Block 3 "Production and logistics plant products"***

**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, 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.

**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.

**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 for various types of canned food (juices, purees, jams, etc.) and with the peculiarity of

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construction of vegetable stores, freezers, refrigerators and buildings for storage of finished canned products.

**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

***Optional Block 4 "Energy-saving technologies in crop and forage production"***

**Crop rotation and tillage in modern farming.** Lectures on discipline covers the theoretical foundations of rotation; crop rotations in different natural and economic conditions and their practical application in Ukraine; intermediate crops in crop rotation and justify their possible use; application and development of crop rotation; features use of short rotational crop rotations and practical recommendations transformation capabilities in multiple-rotation short rotation; practical application of crop rotation crop rotation just in time. Highlights scientific basis of resource saving technologies of mechanical tillage and their practical application in different soil and climatic zones of Ukraine; the theoretical foundations of cultivation; basic theoretical concepts of scientific and practical importance of agriculture: their historical development; solutions to the issues of expanded reproduction of soil fertility; sustainable land use, protection against erosion and obtaining high stable yields of crops in different soil and climatic zones of Ukraine.

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

**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.

**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.

**Natural grasslands in increasing the production of complete feed.** An important reserve for increasing the production of livestock products and a significant factor in its economic efficiency is the feed base of natural forage. The course deals with technological ways of efficient use of natural fodder lands, taking into account the natural-territorial conditions and climatic changes, studies innovative approaches to the organization of grassland systems, capable of maintaining the long productive longevity of perennial grasses and their high yields relative to the form of cultivation. natural land, which allows to control the quality and safety of feed and to influence the degree of technological and ecological ichnoho burden on grasslands.



**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                                      | 42  |
| – Part-time                                      | 35  |
| Duration of Training:                            |   |
| – Full-time educational and professional program | 1,5 years   |
| – Part-time                                      | 1,5 years   |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of Teaching                             | Ukrainian, English  |
| Qualification                                    | Agronomist-researcher,<br>researcher on agrochemistry<br>and soil science |

**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**

***Optional Block "Agrochemical service and quality management of soil"***

The program is directed to formation of the knowledge and skills in agrochemical service of the agricultural industry in field of the plant growing. The program creates the methodological and agrochemical fields in ecological-agrochemical monitoring of the soils and elaboration of the models of the processes of the soil fertility recreation. The program creates practical skills in technological examination of the fields, complex agrochemical diagnostic, diagnostic of the crop nutrition, analysis of the fertilizers and soil meliorates and modern technologies of its application. The place of the program realization is scientific research laboratories and studying production laboratories in the department of the agrochemistry and quality of crop products named by Olexandr Dushechkin.

Establishment and analysis based on field and laboratory studies of physical, water-physical, physical-chemical, biological and agrochemical soil properties, developing measures for their conservation and restoration of fertility. Defining of ecological and genetic status and potential productivity of soils in relation to particular cultures or groups, as well as other specialized use of soil. Establishing the nature and extent of degradation processes. Measures of rational management and improvement of soil fertility. Studying of disturbed and polluted soils reclamation methods, increasing of potential soil fertility after their pollution, destruction, degradation, and through them landscapes and the biosphere as a whole. Metrological aspects of modern instrumental methods of analysis and

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characteristics of modern instrumental methods of analysis. These knowledge and skills are formed by disciplines taught at the Department of Soil Science and Soil Protection. prof. М.К.Шикולי.

### **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 ahrohimservis 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.

### **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 for Master 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 agroecosystem 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>1. GENERAL TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components of EPP</b>   |  |                   |                   |
| CC 1  | Methodology and organization of scientific research in agrochemistry and soil science                                | 6                 | exam              |
| CC 2  | Zoning and structure of the soil cover of Ukraine  | 6                 | exam              |
| CC 3  | Logistics for crop production systems and realization of crop products   | 8                 | exam              |
| <b>Optional components of EPP</b>   |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>                                  |  |                   |                   |
| OB 1  | Optional subject 1   | 4                 | exam              |
| OB 2  | Optional subject 2   | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                               |  |                   |                   |
| <b>Compulsory components of EPP</b>   |  |                   |                   |
| CC 4  | Assessment and management of soil quality  | 7                 | exam              |
| CC 5  | Technological agroservice for lands usage  | 11                | exam              |
| CC 6  | Reclamation of disturbed lands   | 7                 | exam              |
| CC 7  | Modern technologies of soil fertility reproduction   | 7                 | exam              |
| <b>Optional components of EPP</b>   |  |                   |                   |
| <i>Optional Block by specialty</i>  |  |                   |                   |
| <i>Optional Block 1 "Agrochemical service and quality management of soil»</i> |  |                   |                   |
| OB 1.1  | The technologies of the soil chemical melioration  | 3                 | exam              |
| OB 1.2  | The system of the modern special agrochemicals application   | 3                 | exam              |
| OB 1.3  | Land Reclamation   | 3                 | exam              |
| OB 1.4  | Chemistry and soil biology   | 2                 | exam              |
| OB 1.5  | Monitoring soil quality  | 2                 | exam              |
| OB 1.6  | The regulation of the crop nutrition for greenhouse and for fertiigation   | 3                 | exam              |
| <b>The total amount of compulsory components</b>                              |  | <b>52</b>         |                   |
| <b>The total amount of optional components</b>                                |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>   |  |                   |                   |
| CC 8  | Preparation and defense of master's work   | 4                 |                   |
| CC 9  | Production Practice  | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>  |  | <b>90</b>         |                   |

**Annotations of subjects in the curriculum**

**1. 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.

**Zoning and structure of the soil cover of Ukraine.** Studies the patterns of spatial distribution of soils and is the basis of their accounting and evaluation as a natural

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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 it refinement.

## 2. 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 studding 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 of disturbed lands.** Land reclamation technologies for disturbed lands are necessary to improve the fertility of industrial soils in the post-restoration period for the purpose of use in agriculture or forestry. The following methods of land reclamation are being studied: geoconstructional (land surveying, claying, sanding, formation of water-resistant and water-retaining horizons), cultural (cleaning of shelves, trees, garbage and other objects that impede the use of the site for its intended purpose), biological (phytomelioration, tinning, conservation, mycorrhiza) sideration), as well as chemical, hydraulic, agrotechnological and thermal reclamation. Types of land reclamation and land reclamation methods are used depending on the features of the engineering stage of reclamation, taking into account the complex of economic, economic and environmental conditions of a particular region to obtain the best environmental, economic and socio-aesthetic effects.

**Modern technologies of soil fertility reproduction.** The course will allow students to master the scientific principles of soil fertility reproduction on the basis of soil and energy conservation. It aims at a comprehensive assessment of existing crop cultivation technologies in terms of their impact on soil fertility rates. Particular attention will be given

to studying and understanding the measures of soil fertility reproduction by students, taking into account specific conditions, including genesis, soil properties, their structure, the location of the relief elements, the level of groundwater, and the characteristics of the cultivated crops. As a result of the study of the discipline students acquire theoretical and practical knowledge about the features of reproduction of soil fertility, which have been affected by agrophysical degradation, dehumification; acidic, salty, saline, eroded and contaminated soils.

### **Optional components of EPP**

#### *Optional Block by specialty*

#### *Optional Block 1 "Agrochemical service and quality management of soil"*

**The technologies of the soil chemical melioration.** The goal of the studding of the theoretical materials and laboratory classes are mastering into theoretical knowledge and practical skills into the determination of the soil need in chemical melioration, the properties of the modern meliorates according to the active standards, elaboration of the modern technologies of the soil chemical melioration and it making, estimation of the quality of the soil chemical melioration.

**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.

**Land Reclamation.** Studies recovery measures disturbed and degraded lands in nutrient status, particularly for use in agriculture, for forest plantations, creation of recreational areas, construction and stocking artificial reservoirs, creating landscapes that harmonized with the natural environment. The purpose of discipline is to study options and evaluating overburden, classification of disturbed lands, development of measures restore their fertility.

**Chemistry and soil biology.** Studies chemical, physicochemical and biological processes that shape soil fertility and productivity of agroecosystems. 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 soil quality.** Monitoring of soil - a system of observation, measurement and control of the use of soil and land management to organize their productivity. For the diagnosis of soil must possess and be able to interpret these complex informative indices: changes in the structure of soil, land transformation, assessment rates of change of the basic properties of soils, evaluation of display intensity erosion, reclamation performance status, assessment of effective soil fertility. The aim of this course is teaching soil quality monitoring methods to control and prevent negative processes of soil.

**The regulation of the crop nutrition for greenhouse and for fertigation.** 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 fertigation, 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.

**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                                      | 20   |
| – Part-time                                      | 10   |
| Duration of Training:                            |  |
| – Full-time educational and professional program | 1,5 years  |
| – Part-time                                      | 1,5 years  |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of Teaching                             | Ukrainian, English   |
| Qualification                                    | Agronomist-researcher,<br>researcher on breeding and<br>genetics of agricultural crops |

**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**

***Optional Block "State scientific and technical expertise of plant varieties  
and their legal protection"***

Biodiversity is a source of economic value through the use of new and traditional breeding methods aimed at increasing the yield and adaptive potential in the creation and introduction of more sophisticated varieties and hybrids. Methods and directions of breeding are considered to increase the level of efficiency of the mold-making process upon receipt of new breeding material, as a basis for increasing and stabilizing yields in contrasting weather conditions. Breeding technology of individual crops, taking into account their biological and genetic characteristics, as well as the existing gene pool. Types of source material and methods of its creation. The role and importance of sources and donors in the selection of modern varieties and hybrids. The variety is considered as an intellectual property object that is excellent, homogeneous and stable and suitable for distribution in Ukraine, which can be used to meet the needs of society and not prohibited for propagation on the grounds of threat to life and health of humans, damaging plant and fauna, conservation of the environment.



### 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 "Velykosnytynske Education and Research Farm named after O. Muzychenko" 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.

### Proposed Topics for Master 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.
9. Biochemical and bioenergy evaluation of maize feedstock.
10. Use of apozygotic lines in sugar beet breeding.
11. Features of potato seed production by in vitro method.
12. 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>1. GENERAL TRAINING CYCLE</b>             |  |                   |                   |
| <b>Compulsory components of EPP</b>          |  |                   |                   |
| CC 1   | Methodology of breeding experiment   | 6                 | exam              |
| CC 2   | Genetic resources of plants  | 8                 | exam              |
| CC 3   | Methodology and technical support of modern genetic research   | 5                 | exam              |
| <b>Optional components of EPP</b>            |  |                   |                   |
| <i>Optional subjects by Student's Choice</i> |  |                   |                   |

| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|--|--|-------------------|-------------------|
| OB 1   | Optional subject 1   | 4                 | exam              |
| OB 2   | Optional subject 2   | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components of EPP</b>  |  |                   |                   |
| CC 4   | Special genetic field crops  | 6                 | exam              |
| CC 5   | Genetics immunity against diseases and pests   | 6                 | exam              |
| CC 6   | Special breeding and seed production of crops  | 7                 | exam              |
| CC 7   | Adaptive breeding  | 7                 | exam              |
| CC 8   | Special breeding and seed-growing heterosis hybrids  | 7                 | exam              |
| <b>Optional components of EPP</b>  |  |                   |                   |
| <i>Optional Block by specialty</i>   |  |                   |                   |
| <i>Optional Block 1 "State scientific and technical expertise of plant varieties and their legal protection"</i> |  |                   |                   |
| OB 1.1   | Qualification examination of plant varieties   | 5                 | exam              |
| OB 1.2   | Varietal certification   | 5                 | exam              |
| OB 1.3   | DNA technology in breeding and seed production   | 6                 | exam              |
| <b>The total amount of compulsory components</b>   |  | <b>52</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>  |  |                   |                   |
| CC 9   | Preparation and defense of master's work   | 4                 |                   |
| CC 10  | Production Practice  | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>   |  | <b>90</b>         |                   |

## Annotations of disciplines in the curriculum

### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Methodology of breeding experiment.** Modern genetics is increasingly marked by its penetration into all areas of biological science. Plant breeding is an important field of practical application of genetic research. Students will become familiar with peculiarities of breeding and genetic techniques, such as increasing productivity of existing crop varieties, creating new varieties, as well as with methods of studying genetic information, patterns of its preservations and transfer to progeny. Will become familiar with the theory and practice of breeding work, methods of creation of starting material, selection of parental components for crossing, to have methods for determining the genetics of resistance to abiotic and biotic factors; master the methods of accounting plants for winter hardiness, frost, heat resistance, resistance to harmful organisms; get acquainted with the breeding links for the creation of varieties and hybrids.

**Genetic resources of plants.** The tasks and role of varietal resources in the sustainable development of crop and national food security. Their creation and preservation. The international law and international centers of genetic plant resources. The system varietal genetic resources in Ukraine. Adapting domestic seed production to international scheme and procedures. The relationship between originators, producers and consumers varietal resources. The review of the bank's varietal resources, the use of classifiers and directories available varietal range. Methods for identifying plant varieties. Registers plant varieties and producers of seed and planting material.

**Methodology and technical support of modern genetic research.** The purpose of teaching the discipline of illuminating the idea of modern platforms for conducting genetic analysis, basic tools and platforms for the primary nucleotide sequence of genomes, fragmentation of genetic analysis, modern devices for microscopy and visualization of molecular processes; provide practical skills for bioinformatic analysis of sequencing data and genome analysis.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Special genetic field crops.** Total problems of the genetics of plants. Genetics determination and inheritance mechanisms of qualitative and quantitative traits. The specific nature of genetic systems to propagation of plants. Importance of grain, grain legume, cereal, feed, vegetable, horticultural crops. Genetical centers of origin, classification and karyology of the agricultural crops. The genetics of morphological, physiological and biochemical traits. The specific nature of propagation's systems of plants, occurrence of polyploidy row among species of genus. The genetics mechanisms of plants resistance control against the agents of disease and invaders. Principal directions of selection by grain, grain legume, cereal, feed, vegetable, horticultural crops.

**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.

**Special breeding and seed production of crops.** The discipline covers breeding technology of specific cultures with regard to their biological and genetic characteristics, as well as the existing gene pool. Tasks and directions of breeding. Model varieties. The original material. Intraspecific hybridization and selection hybrid descendants. Interspecific hybridization. Methods and equipment crossings. The use of mutagenesis and polyploidy. Methods and schemes of selection in mutant and polyploid populations. Features estimation of breeding material in productivity, length of growing period, the quality of products. The scheme of the breeding process. The achievement of breeding. The theoretical basis of seed production. The concept of varietal and sowing qualities of seeds. Causes of deterioration of seed quality. Categories of seeds. The system of seed production of major field crops. Seed production of primary links of grain, leguminous and cereal crops. The procedure of organization seed control by subjects of seed production in Ukraine. The methodology of approbation varietal sown cereal crops. Manual on approbation of variety sown of leguminous crops, perennial and annual forage grasses.

**Adaptive breeding.** Theoretical bases of adaptive selection. Mechanisms of adaptation of plants. Features of ontogenetic adaptation of plants. Морфоанотомічна adaptation. Ecological firmness of plants. Features of adaptation of plants are to the basic factors of environment. Adaptation of plants to the temperature, to water stress, to light, edaphic factors. Principles of adaptive selection. Natural and artificial selections. Basic methods and directions of adaptive selection. A role of feedstock is in a selection on an adaptivity. Centers of origin of cultural plants. Collection of seed. Creation of genetic collections of adaptive signs. Creation of collection of marker genes. Adaptation of plants is to biotic stresses. Types of firmness are against pathogens. A hypothesis of Флора is a "ген-на-ген". Co-operation of genes of firmness. System "owner-parasite-environment". Co-operating is with the terms of environment.

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**Special breeding and seed-growing heterosis hybrids.** Discipline provides knowledge features of breeding and seed-growing of hybrids F1 corn, sunflower, sugar beets, sorghums and synthetic varieties of winter-annual rye, buckwheat, clover, alfalfa. General bases of heterosis. Modern conceptions of heterosis and conformity to law of his display. Types of hybrids and technology of its creation. Types of initial material and methods creation of inbreed lines. The effect of Heterosis identifying and predicting by hybrids. Estimation of general and specific combination ability of inbreed lines. Application cross-test for the evaluation of plant-breeding material on GCA. Selection combinations of hybrids different genetic structure, and also synthetic varieties. Methodology and technique of plant-breeding process hybrids of F1. Methods of industrial production of hybrid seed of the field cultures on fertile and sterile basis. System of seed-growing. Seed-growing of inbreed lines. Growing of hybrid seed. Methodology of realization the field examination, field and collar inspections. Conduct of documentation. The procedure of organization seed control by subjects of seed production in Ukraine.

### **Optional components of EPP**

#### *Optional Block by specialty*

#### *Optional Block 1 "State scientific and technical expertise of plant"*

**Qualification examination of plant varieties.** 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 yu 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.

**Varietal certification.** Discipline provides disclosure schemes varietal seed certification requirements of the International Organization for Economic Cooperation and Development (OECD), which provide a set of procedures, methods and techniques to ensure high-quality and sowing qualities of seeds of all categories in the process of reproduction, the authenticity of varieties and varietal purity . Application of identification of plant varieties provides authentication of the variety, degree of homogeneity. Knowledge of discipline consolidate practical skills application of methods of identification of plant varieties (morphological description, electrophoresis, DNA - markers, PCR - analysis, etc.) in the varietal certification (field inspection and POSTcontrol) and further morphological, biochemical, genetic certification classes, which is the basis of international commercial seed treatment as import-export. The knowledge acquired in their practice breeder may apply, expert, researcher and manufacturer of seeds.

**DNA technology in breeding and seed production.** Conventional methods for identifying varieties and hybrids are based on an assessment of morphological and agronomic traits. The use of these methods is still relevant for field collections, but there are limitations. Much more precise are molecular genetic markers (proteins, DNA isoenzymes-markers), which allow us to identify differences between varieties, breeding lines, biotypes at the genotype level. Therefore, they are widely used for identification and

study of the genetic diversity of the varietal gene pool, including samples stored under controlled conditions in vitro and cryopreservation, in breeding and genetic studies to select parent pairs for crosses and marker-associated selection, in seed production to determine the level of hybridity of inbred lines, varietal purity and biotype composition of varieties. The use of proteins and isoenzymes for the identification of varieties and hybrids is limited, since proteins are characterized by low polymorphism, and isoenzyme spectra are not always stable, and can change through the physiological state of plants. DNA markers do not have such disadvantages, and therefore are widely used in research. Over the past decades, various types of DNA markers have been created: RAPD, ISSR, AFLP, SSR, of which the most convenient and effective are markers based on the use of polymerase chain reaction.

**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                                      | 25  |
| – Part-time                                      | 10  |
| Duration of Training:                            |   |
| – Full-time educational and professional program | 1,5 years   |
| – Part-time                                      | 1,5 years   |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of Teaching                             | Ukrainian, English  |
| Qualification                                    | Agronomist-researcher,<br>researcher on agrochemistry<br>and soil science |

**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**

***Optional Block "Digital management using agrochemical resources"***

The Master's program is aimed at the formation of theoretical knowledge and practical skills for future specialists in the organization, management and control of precision agriculture. The program forms deep theoretical knowledge of plant physiological processes, methodological aspects for monitoring of soil fertility and plant condition, as well as the modern level of technical support for precision agriculture. For the study of this program, the future specialist acquires practical skills in using GIS technologies, means of remote sensing vegetation cover, mapping, mapping-tasks and technical implementation of software solutions in a precise service to develop and implement resource-saving technologies for the use of agrarian resources.

**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.

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Graduates can work in the system of regional branches of research institute "Ukrzemprom", 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, NAAN Research Institutes and NAS of Ukraine, educational and scientific laboratories of the NUBiP departments of Ukraine.

### Proposed Topics for Master 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>1. GENERAL TRAINING CYCLE</b>                |   |                   |                   |
| <b>Compulsory components of EPP</b>             |   |                   |                   |
| CC 1  | Methodology and organization of scientific research in agrochemical service with the basics of intellectual ownership | 5                 | exam              |
| CC 2  | Spatial heterogeneity of soil cover   | 5                 | exam              |
| CC 3  | Agrochemical service in plant growing   | 9                 | exam              |
| <b>Optional components of EPP</b>               |   |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |   |                   |                   |
| OB 1  | Optional subject 1  | 4                 | exam              |
| OB 2  | Optional subject 2  | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |   |                   |                   |
| <b>Compulsory components of EPP</b>             |   |                   |                   |
| CC 4  | Technological provision for agrohimeservice   | 6                 | exam              |
| CC 5  | Physiology and diagnostics of plant nutrition   | 10                | exam              |
| CC 6  | Agrochemical soil monitoring  | 6                 | exam              |
| CC 7  | Agrochemical remote monitoring of phytocoenoses   | 6                 | exam              |
| CC 8  | Soil and foliar fertilization   | 5                 | exam              |
| <b>Optional components of EPP</b>               |   |                   |                   |
| <i>Optional Block by specialty</i>              |   |                   |                   |

| 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 1 "Digital management using agrochemical resources"</i> |  |                   |                   |
| OB 1.1  | GIS in agrochemical service  | 5                 | exam              |
| OB 1.2  | Differentiated application of agrochemical resources   | 7                 | exam              |
| OB 1.3  | Software solutions in Agrochemical service   | 4                 | exam              |
| <b>The total amount of compulsory components</b>                          |  | <b>52</b>         |                   |
| <b>The total amount of optional components</b>                            |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>   |  |                   |                   |
| CC 9  | Preparation and defense of master's work   | 4                 |                   |
| CC 10   | Production Practice  | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>  |  | <b>90</b>         |                   |

### Annotations of disciplines in the curriculum

#### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Methodology and organization of scientific research in agrochemical service with the basics of intellectual ownership.** The purpose of studying the discipline is to master students of EL "Master" with knowledge about methodology, technology of organization and carrying out of scientific agrochemical researches, acquaintance with the basics of intellectual property. The study of the lecture and laboratory course of the discipline facilitates the assimilation of the conceptual terminological apparatus of scientific activity and the theoretical positions of modern foundations for scientific research, forms knowledge on the stages of research work, the ability to substantiate the protection of rights to objects of intellectual property, develops practical skills in organizing and conducting research work, work with various types of research information, including modern scientific-metric bases (Scopus, Web of Science, etc.). Provides training for a specialist who will have the knowledge and skills to conduct tests on a chosen topic of research at a scientific level and will have the ability to reasoned presentation of their results.

**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.

## 2. SPECIAL (PROFESSIONAL) 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.

**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.

**Agrochemical remote monitoring of phytocoenoses.** The educational discipline aims at the formation of qualification theoretical knowledge, methodological insights and practical skills in agrochemical inspection of vegetation cover, using various methods and means of remote sensing - mobile devices of spectral analysis, ground sensory equipment, unmanned aerial vehicles (UAVs), satellites. The lecture course reveals methodological approaches to remote monitoring of agrochemical parameters (mineral nutrition of plants, individual soil fertility indices, fertilizer application efficiency and action).

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Laboratory classes allow a magistracy student to practically work out the whole algorithm of conducting such surveys, learn to rationally interpret the obtained data for practical application. The latter is carried out through the development of a map-task for technological operations, and recommendations for the regulation of individual agrochemical parameters.

**Soil and foliar fertilization.** The purpose of theoretical and practical study of the discipline is the formation of the theoretical knowledge and practical skills for the masters about the meaning, tasks, methods and features of the organization of root, inland and foliage fertilization. In the course of studying the discipline, theoretical and practical attention is paid to the innovative technologies of introducing liquid mineral fertilizers by injection method and using applicators-plant extenders. Students will master the requirements for spraying, spraying selection and preparation techniques for working solutions. The outcome of the course is the ability of masters to develop technical and technological documentation and build a logistic scheme for root, inland and foliage fertilization.

### **Optional components of EPP**

#### *Optional Block by specialty*

#### *Optional Block 1 "Digital management using agrochemical resources"*

**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.** For the study of the lecture and laboratory course "Differentiated use of agrochemical resources", the student acquires theoretical knowledge and practical skills concerning the technology of cultivating cultures developed in accordance with the results of examination and complex agrochemical diagnostics; crop yield management, taking into account intraoral variability of plant life and optimizing the use of consumables; modern agricultural machinery controlled by on-board computers and capable of differentiated carrying out of agrotechnical operations, precision positioning devices on the ground (GPS receivers), technical systems that help to detect heterogeneity of the field (automatic samplers, various sensors and measuring complexes, harvesting machines with automatic recording crops, remote sensing instruments for agricultural crops, detailed GIS maps, etc.).

**Software solutions in Agrochemical service.** During the study of the discipline, the specialists acquire theoretical knowledge and practical skills in the accumulation and preservation of data, modern software for Agrochemical service, the use of mobile applications, etc.

**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                                      | 45   |
| – Part-time                                      | 30   |
| Duration of Training:                            |  |
| – Full-time educational and professional program | 1,5 years                                  |
| – Part-time                                      | 1,5 years                                  |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of Teaching                             | Ukrainian, English                         |
| Qualification                                    | Horticulture and viticulture<br>researcher |

**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**

***Optional Block "Horticulture"***

There is foreseen in this master's degree program that students are to be fulfilled the scientific and practical works on different problems of a horticultural branch. The theme of master's degree works may be chosen within such cycle of tasks: modern technologies of the new orchard establishment, looking after plantation during the vegetation period, ways of growing the planting material, selection of cultivars with useful properties, investigations on cultivar resistance to unfavorable changes of environmental conditions and harmful organisms, prognosis and programming of yield for fruit crops, methods of computer processing the results of investigations. The gist of program is providing to the students such knowledge as analyze of technologies for the growing of the vegetables, mushrooms and flowers in different types of greenhouses and their adaptation for the production's terms, and make technological decisions that will deliver the best results while minimizing resource costs.

**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 for Master 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.
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>1. 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>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 4                 | exam              |
| OB 2  | Optional subject 2   | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 4  | Sustainable fruit production   | 10                | exam              |



| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|--|--|-------------------|-------------------|
| 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              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional Block by specialty</i>               |  |                   |                   |
| <i>Optional Block 1 "Horticulture"</i>           |  |                   |                   |
| OB 1.1   | Organic fruit production   | 4                 | exam              |
| OB 1.2   | Production and certification of planting material  | 4                 | exam              |
| OB 1.3   | Organic vegetable-growing in field terms and protected cultivated  | 4                 | exam              |
| OB 1.4   | Hydroponics  | 4                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>52</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 9   | Preparation and defense of master's work   | 4                 |                   |
| CC 10  | Production Practice  | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

### Annotations of subjects in the curriculum

#### 1. 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.

## 2. 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

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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. 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**

*Optional Block by specialty*

*Optional Block 1 "Horticulture"*

**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.** Course of study investigates the legislative framework and production systems for certified healthy fruit and berry planting material and modern intensive profitable technologies of plant material production on the example of the achievements of scientific gardening institutions of Ukraine and best foreign technologies.

**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

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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 place for organic technologies, certifications schemes, methods of plant's depend for the pest, diseases and weeds in organic Horticulture.

**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.

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

**Dean** - doctor in agricultural sciences, Associate professor Yuliia Kolomiiets

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 with in specialties:

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

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

Guarantor of the educational and professional program – Gaychenko Vitaliy Andriyovych, doctor of biological sciences, professor, professor of the department of agrosphere ecology and environmental control.

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

Guarantor of the educational and professional program – Chaika Volodymyr Mykolayovych, doctor of agricultural sciences, professor, head of the department of agrosphere ecology and environmental control.

Department in charge of graduate training:

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

Tel.: (044) 527-81-95

E-mail: vchaika28@gmail.com

Head of the department – Doctor of Agricultural Sciences, Professor V. M. Chaika

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

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

Guarantor of the educational and professional program – Mykola Mykhailovych Lisovyi, doctor of agricultural sciences, professor, professor of the department of molecular biology, microbiology and biosafety.

Department in charge of graduate training:

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

Tel.: (044) 527-85-17

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

Head of the Department – Doctor of Agricultural Sciences, M. V. Patyka

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

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

Guarantor of the educational and professional program – Mykola Mykolayovych Dolia doctor in agricultural sciences, professor, dean faculty of plant protection, biotechnology and ecology.

Departments in charge of graduate training:

#### **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\_Peresupkin@ukr.net

Head of the department — Doctor of Biology Science, Professor A.L. Kryuchkova

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

Guarantor of the educational and professional program – Sykalo Oksana Oleksiivna, candidate of agricultural sciences, associate professor of the department integrated protection and plant quarantine.

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

Tel.: 527-82-12

E-mail: kaf.izkr@gmail.com

Head of the department – PhD in Biological Sciences, Associate professor, A.G. Babych



**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 | 1,5 year                    |
| – Part-time                                      | 1,5 year                    |
| Credits ECTS:                                    |                             |
| – educational and professional program           | 90                          |
| Language of Teaching                             | Ukrainian, English          |
| Qualification                                    | Master in 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.

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

***Optional Block "Ecological control in agrarian sphere: monitoring, certification, expertise"***

The training of ecologist, who gain the knowledge of agro-ecological monitoring of agrarian sphere territories; inspector inspections of economic entities, entities of ecological certification of industrial and agricultural enterprises, rural communities, hard domestic waste, land lots, fodder grounds and natural and recreation objects; landscape and ecologic expertise of the agrarian objects and the cultivation of crops technologies.

**Areas of employment of graduates**

The valedictorians activity of this master program concerns the organization, support, performance and observance of ecological control in the agrarian sphere of

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monitoring, audit, certification, examination for regulation of socio-economical and ecologically safe development of territories and enterprises of the agro-sphere. The places of employment for such valedictorians are the enterprises of the agribusiness industry of different property forms, in particular: LLC "Agrokhimservis"; PE "Agroresursy", LLC Agrarian "Germes", CJSC Stud Farm "Agro Region", LLC "Druzhba-Nova", Kraft Foods Ukraine etc.

### Practical training

The practical training of the experts is held on the scientific and research farm units of SD of the National University of Life and Environmental Sciences of Ukraine: "Velukosnitynskyi scientific and research farm named after O. V. Muzychenko", "Scientific and research farm "Vorzel", "Agronomic research station", and the Institute of Agroecology and Ecosystem Exploitation of the NAAS of Ukraine, the Institute of Plant protection of the NAAS of Ukraine, LLC "Svitanok-agrosvit", Ukrainian Public Scientific and Research Institute "RESURS", LLC scientific and Production Firm "Agroecosystems Ltd."

### Proposed Topics for Master Theses

1. Ecological certification of different origin and economic use water sources.
2. Assessment of lands appropriateness developing the ecologically safe raw materials zone for production of baby and diet food.
3. Ecological control of soils quality – territories ecological certification.
4. Ecological and hydroeconomic measures for water quality establishment.
5. Ecological management, marketing and audit on the agrarian enterprises.
6. Ecological policy: global, national (public), regional, field, corporative.
7. Water quality ecological assessment of different level occurrence on the farm or production district.
8. General environment impact assessment of the agribusiness enterprises and ecological situations characteristic in agrarian sphere.
9. Environmental approval of the agricultural products and raw materials production technologies.
10. Ecological inspection of the hazardous agrarian enterprises.

### 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>1. GENERAL TRAINING CYCLE</b>             |  |                   |                   |
| <b>Compulsory components of EPP</b>          |  |                   |                   |
| CC 1   | Civil defense  | 3                 | exam              |
| CC 2   | Problems of ecological safety and modern concepts of optimization of nature use                                      | 3                 | exam              |
| CC 3   | Methods and organization of scientific studies   | 3                 | exam              |
| CC 4   | Sustainable development strategy   | 3                 | exam              |
| CC 5   | Business foreign language  | 3                 | exam              |
| CC 6   | Agricultural and Ecological policy   | 3                 | exam              |
| CC 7   | Philosophy of science and innovation development   | 2                 | exam              |
| <b>Optional components of EPP</b>            |  |                   |                   |
| <i>Optional subjects by Student's Choice</i> |  |                   |                   |
| OB 1.  | Optional components  | 4                 | exam              |
| OB 2   | Optional components  | 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>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>   |  |                   |                     |
| <b>Compulsory components of EPP</b>   |  |                   |                     |
| CC 8  | Environmental control and management   | 6                 | exam                |
| CC 9  | Ecological management and audit  | 6                 | exam                |
| CC 10   | Ecological standardization and certification   | 4                 | exam                |
| CC 11   | Agricultural radioecology  | 6                 | exam                |
| CC 12   | System analysis of environmental quality   | 4                 | exam                |
| CC 13   | Experimental radioecology  | 6                 | exam                |
| CC 14   | Radiation monitoring and safety  | 4                 | exam                |
| <b>Optional components of EPP</b>   |  |                   |                     |
| <i>Optional Block of choice by specialty</i>  |  |                   |                     |
| <i>Optional Block 1 "Ecological control in agrarian sphere: monitoring, certification, expertise"</i> |  |                   |                     |
| OB 1.1  | Agroecology  | 4                 | exam                |
| OB 1.2  | Environmental Impact Assessment  | 4                 | exam                |
| OB 1.3  | Agro-ecological control and management (monitoring, certification, management, inspection)                           | 4                 | exam                |
| OB 1.4  | Modern biotechnologies and bio-safety  | 4                 | exam                |
| <i>Optional Block 2. "Radiobiology and radioecology"</i>  |  |                   |                     |
| OB 2.1.   | Assessment of radiation risks for humans and the environment   | 4                 | exam                |
| OB 2.2  | Hygiene and social factors of the population's life in contaminated territories                                      | 4                 | exam                |
| OB 2.3  | Ecotoxicology  | 4                 | exam                |
| OB 2.4  | Biological methods in radiation research   | 4                 | exam                |
| <b>The total amount of compulsory components</b>  |  | <b>56</b>         |                     |
| <b>The total amount of optional components</b>  |  | <b>24</b>         |                     |
| <b>3. OTHER TYPES OF TRAINING</b>   |  |                   |                     |
| CC 15   | Production Practice  | 9                 | differential credit |
| CC 16   | Preparation and defense of master's work   | 1                 | protection of work  |
| <b>THE TOTAL AMOUNT OF EPP</b>  |  | <b>90</b>         |                     |

## Annotations of disciplines in the curriculum

### 1. 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.

**Problems of ecological safety and modern concepts of optimization of nature use.** 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.

**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.

**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.

**Agricultural and Ecological policy.** Examines the documented and officially declared (approved) system of ecological concepts, principles, approaches, priorities and activities, that defines the relationship between the society, the state and the environment, generates knowledge and skills of future leaders in the development of environmental policies, systems of production, management of enterprises and corporations through which the adherence of the administration for environmental priorities shall be demonstrated.

**Philosophy of science and innovation 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 postnonclassical ideals of scientism. Methodology of perception of scientific and innovative activity. Study of basic scientific forms. Value of basic and applied research strategies. Philosophical foundations of classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of scientific worldview. Logic of scientific research in the context of contemporary global issues (environmental, technological and social). Axiological dimension of science: the problem of responsibility of the scientist.

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## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Environmental control and management.** 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 and audit.** 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.

**Ecological 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 Environmental Quality** Investigates the general engineering training of specialists in the field of complex environmental systems analysis as the basis

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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.

**Radiation monitoring and safety** Formation of knowledge and skills concerning sources and properties of ionizing radiation, radioactive contamination of environmental objects, regularities of migration of radionuclides by biological circuits and forecasting their accumulation in agricultural produce, methods of dosimetry of ionizing radiation and measurement of activity in environmental objects, modern radiation state in Ukraine, as well as principles of creation and functioning of radiation monitoring system and radioecological monitoring ring, normalization of radiation exposure to the human body and acceptable levels of radionuclide content in food, agricultural raw materials, sweat water and air in Ukraine and in the world. Radioecological monitoring should be considered as an integral part of the complex state system of environmental monitoring at all its levels and directions.

### **Optional components of EPP**

*Optional Block of choice by specialty*

*Optional Block 1 "Ecological control in agrarian sphere: monitoring, certification, expertise"*

**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 (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,

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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.

**Modern biotechnology and biosafety.** Examines the principles and methods of applied areas of environmental science and classical and modern biotechnology processes carried out by the use of living organisms or other biological agents, and are aimed to protecting and restoring the environment damaged by human, maintaining functional stability of the biosphere as a whole or certain components of natural ecosystems.

*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

**Hygiene and social factors of the population's life in contaminated territories**

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.

**Ecotoxicology** 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.

**Biological methods in radiation research** Form students knowledge about 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.

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

|  |                             |
|--|-----------------------------|
| Form of Training:                                | Licensed number of persons: |
| – Full-time                                      | 30                          |
| Duration of Training:                            |                             |
| – Full-time educational and professional program | 1,5 year                    |
| Credits ECTS:                                    |                             |
| – educational and professional program           | 90                          |
| Language of Teaching                             | Ukrainian                   |
| Qualification                                    | Master in 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.

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

***Optional Block "Control and expert regulation in the agrosphere"***

Preparation involves the formation of knowledge to solve natural and resource, environmental and ecological problems and anthropogenic issues of control in bio, agro, urbo-, technological, geosphere, recreational, tourist and social sectors. In particular, the development, planning, design and implementation of industrial and economic systems and controls; prediction, forecasting and modeling of natural systems and the development and technogenically disturbed natural-territorial complexes geosphere; identification of sources of environmental impact; establishment an acceptable level of risk for people and the environment now and in the future, and others.

**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

Ukrainian Laboratory of Quality and Safety of Agricultural Products, State Enterprise "Ukrainian Research and Training Center of Standardization, Certification and Quality, Ukrainian State Research Institute "Resource", LLC of "Green Wolf", Institute of Agroecology and Ecosystem Exploitation of the NAAS of Ukraine and other.

### Proposed Topics for Master Theses

1. Implementation of ecological expert assessment of the project documentation when making environmentally focused solutions for strategic planning and sustainable development of territories.
2. Implementation of ecological and socio-economic expertise of enterprises and objects on conservation areas.
3. Development of programs of sustainable development of agricultural areas in the optimization of social systems.
4. Implementation of environmental inspection of air-security, water management, reclamation and re cultivation work.
5. Determination of environmental risk and safety at the facilities management (by types of nature).

### 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>1. GENERAL TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components of EPP</b>                                       |  |                   |                   |
| CC 1  | Civil defense  | 2                 | exam              |
| CC 2  | Sustainable development strategy   | 3                 | exam              |
| CC 3  | Methods and organization of scientific studies   | 4                 | exam              |
| CC 4  | Business foreign language  | 3                 | exam              |
| CC 5  | Agricultural and Ecological policy   | 3                 | exam              |
| CC 6  | Industrial and environmental management  | 3                 | exam              |
| <b>Optional components of EPP</b>   |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>                              |  |                   |                   |
| OB 1  | Optional components  | 4                 | exam              |
| OB 2  | Optional components  | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                           |  |                   |                   |
| <b>Compulsory components of EPP</b>                                       |  |                   |                   |
| CC 7  | Ecological inspection  | 7                 | exam              |
| CC 8  | Ecological management  | 7                 | exam              |
| CC 9  | Ecological audit   | 7                 | exam              |
| CC 10   | Systems analysis of environmental quality  | 3                 | exam              |
| CC 11   | Ecological control and safety  | 4                 | exam              |
| CC 12   | Regulatory and methodological support of control of expert activity of ecologist                                     | 3                 | exam              |
| CC 13   | Methods of environmental analyses  | 4                 | exam              |
| CC 14   | Ecological and low regulation of environment   | 3                 | exam              |
| <b>Optional components of EPP</b>   |  |                   |                   |
| <i>Optional Block of choice by specialty</i>                              |  |                   |                   |
| <i>Optional Block 1 "Control and expert regulation in the agrosphere"</i> |  |                   |                   |
| OB 1.1  | Environmental Risk Assessment activities   | 4                 | exam              |
| OB 1.2  | Soil and environmental monitoring and management of land resources in the agrosphere                                 | 4                 | exam              |

| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control   |
|--|--|-------------------|---------------------|
| OB 1.3   | Professional ecological expert activity  | 4                 | exam                |
| OB 1.4   | Ecotoxicological estimation of pesticides, agrochemicals and technologies  | 4                 | exam                |
| <b>The total amount of compulsory components</b> |  | <b>56</b>         |                     |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                     |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                     |
| CC 15  | Production Practice  | 9                 | differential credit |
| CC 16  | Preparation and defense of master's work   | 1                 | protection of work  |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                     |

### Annotations of disciplines in the curriculum

#### 1. 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.

**Agricultural and Ecological policy.** Examines the documented and officially declared (approved) system of ecological concepts, principles, approaches, priorities and activities, that defines the relationship between the society, the state and the environment, generates knowledge and skills of future leaders in the development of environmental policies, systems of production, management of enterprises and corporations through which the adherence of the administration for environmental priorities shall be demonstrated.

**Industrial and environmental management.** The main advantages of the discipline are the practical orientation and the formation of skills to identify problems of production in the analysis of specific situations, to suggest ways to solve them according to selected criteria and to evaluate the expected results; to develop a system of individual indicators of indicators of the production potential of the enterprise and to interpret the results of the research; to develop the planning documentation of the production enterprise. When teaching discipline actively used situational tasks, discussions, presentations.

## 2. 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

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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.

**Systems analysis of environmental quality.** Systems theory in ecology is an interdisciplinary area of scientific research and eco-oriented disciplines that forms knowledge for developing generalized models of natural and anthropogenically-modified systems, constructing logical and methodological conceptual description of functioning and behavior at the ecosystem objects, generating the generalized theories (hypotheses, laws) of ecosystems (land, water - natural and anthropogenic) of different types (agro, urbo-, techno- systems), including the systems dynamic theory of purposeful behavior, genesis, evolution and historical development of the hierarchical structure, the governance processes of systems. System Analysis of the environmental quality examines the set of scientific, educational, industrial (technological) problems, which in their specificity and diversity are similar and are considered as a whole in terms of the object being tested in different types of ecosystems, generates skills for building scenarios of representation of ecosystems and means of the study of objects and their components (description, explanation, interpretation, modeling, prediction, prevention, design, construction). GIS analysis of agrolandscapes examines the foundations of geographic information systems and spatial analysis allowing the use of GIS in ecology for modeling, forecasting and monitoring.

**Ecological control and safety.** 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 methodological support of control of expert activity of ecologist.** 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.

**Methods of environmental analyses** forms in students the idea of structure and elements of the environment, hydrosphere and lithosphere parameters to be measured and evaluated, methods and instruments for measuring the chemical, physical, mechanical and biological parameters, norms and standards for water quality and soil assessment, nature, objectives, types and methods of environmental monitoring, organizing and monitoring the features of geosphere, skills and abilities: measuring the chemical, physical

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and mechanical parameters of the environment in the field and laboratory during environmental assessments and examining the aquatic environment and soil, conducting the environmental monitoring, assessing by the results of the measurements and making the appropriate predictions about the state of the environment, use of environmental monitoring data, recommend specific types of monitoring the performance of environmental assessments and examinations territories and objects, predicting the environmental situation on the basis of monitoring data.

**Ecological and low regulation of environment.** 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.

### **Optional components of EPP**

*Optional Block of choice by specialty*

*Optional Block 1 "Control and expert regulation in the agrosphere"*

**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 agroecosystems, 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.

**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 estimation of pesticides, agrochemicals and technologies** 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.

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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 | 1,5 year                                   |
| – Part-time                                      | 1,5 years                                  |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of Teaching                             | Ukrainian, English                         |
| Qualification                                    | Master in 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 "Biosafety and bioethics"***

The program is aimed at studying heredity and changeability of organisms with new, technically created features and their expansion and possible consequences for ecobiocenoses; studies the main legislative documents and agreements in the sphere of biosafety that are accepted in Ukraine and the range of other leading countries in the world; ethical aspects and problems of biosafety ethics while manipulating the cells, organs and organisms, principles and mechanisms of manipulating the genomes, achievements of gen engineering and therapy and also a range of modern biotechnologies, their benefit and risks for bioworld of the planet.

**Spheres of employment of the 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.

***Optional block "DNA certification and genome mapping"***

The essence of Training of masters of sciences lies in the studying of main methods of practical diagnostics and identification of genetically modified organisms in food, mastering the methodology and systems of DNA passport systems of precious agricultural

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plants with the help of modern biotechnologies and molecular-biological methods. The special part of the program gives an opportunity to master main techniques in the work with genetic material that is necessary for training highly qualified specialists of branch subdivisions.

### Spheres of employment of the 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.

### 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 for Master Theses

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 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>1. GENERAL TRAINING CYCLE</b>    |  |                   |                   |
| <b>Compulsory components of EPP</b> |  |                   |                   |
| CC 1                                | Philosophy of science and innovation development   | 3                 | exam              |
| CC 2                                | Civil defense  | 3                 | exam              |
| CC 3                                | Strategy of sustainable development of nature and society  | 2                 | exam              |
| CC 4                                | Ecology Biotechnology  | 4                 | exam              |
| CC 5                                | Plant Biotechnology  | 5                 | exam              |
| CC 6                                | Information Technology   | 3                 | exam              |

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| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control   |
|--|--|-------------------|---------------------|
| CC 7   | Applied Ecology  | 3                 | exam                |
| CC 8   | Biological Statistics  | 3                 | exam                |
| <b>Optional components of EPP</b>                                  |  |                   |                     |
| <i>Optional subjects by Student's Choice</i>                       |  |                   |                     |
| OB 1   | Optional components 1  | 4                 | exam                |
| OB 2   | Optional components 2  | 4                 | exam                |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                    |  |                   |                     |
| <b>Compulsory components of EPP</b>                                |  |                   |                     |
| CC 9   | Methodology and organization of scientific research on the basics of intellectual property                           | 3                 | exam                |
| CC 10  | Business foreign language  | 4                 | exam                |
| CC 11  | Agricultural policy  | 3                 | exam                |
| CC 12  | Instrumental methods of analysis   | 5                 | exam                |
| CC 13  | Biosafety  | 3                 | exam                |
| CC 14  | Design bioprocess  | 4                 | exam                |
| CC 15  | Biotechnology in agriculture and biotekmetody in environmental biotechnologies                                       | 3                 | exam                |
| CC 16  | Biomarketing of biotech products   | 2                 | exam                |
| <b>Optional components of EPP</b>                                  |  |                   |                     |
| <i>Optional Block of choice by specialty</i>                       |  |                   |                     |
| <i>Optional Block 1 "Biosafety and Bioethics"</i>                  |  |                   |                     |
| OB 1.1   | Microclonal plant propagation  | 4                 | exam                |
| OB 1.2   | Immune Biotechnology   | 4                 | exam                |
| OB 1.3   | Transport systems of plants  | 4                 | exam                |
| OB 1.4   | Cell selection for resistance  | 4                 | exam                |
| <i>Optional Block 2 "DNA-certification and mapping the genome"</i> |  |                   |                     |
| OB 2.1   | Diagnosis and identification of GMO DNA Passport   | 4                 | exam                |
| OB 2.2   | Cell and Molecular Biology   | 4                 | exam                |
| OB 2.3   | Genetic Engineering  | 4                 | exam                |
| OB 2.4   | Molecular Virology   | 4                 | exam                |
| <b>The total amount of compulsory components</b>                   |  | <b>56</b>         |                     |
| <b>The total amount of optional components</b>                     |  | <b>24</b>         |                     |
| <b>3. OTHER TYPES OF TRAINING</b>                                  |  |                   |                     |
| CC 17  | Production Practice  | 6                 | differential credit |
| CC 18  | Preparation and defense of master's work   | 4                 | protection of work  |
| <b>THE TOTAL AMOUNT OF EPP</b>                                     |  | <b>90</b>         |                     |

## Annotations of disciplines in the curriculum

### 1. 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.** 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.

**Strategy of sustainable development of nature and society.** 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.

**Biological statistics.** Generates knowledge of basic methods of statistical data Math. Providing the skills of mathematical processing of the results of research, graphics.

## 2. 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

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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 agroecosis. Biotechnological processes in ecosystems that are created during the growth of environmentally friendly crop production are explained.

**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

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organization of industrial and commercial activities, timely adapt to changing of marketing environment, to ensure sustainable functioning of biotech companies.

### **Optional components of EPP**

*Optional Block of choice by specialty*

*Optional Block 1 "Biosafety and Bioethics"*

**Microclonal plants propagation** Studying theoretical and practical aspects microclonal propagation of plants under in vitro, namely the principles and theoretical basis of preparation of culture media, the effect of growth regulators on the growth and development of plants, the physiological basis of morphogenesis, method and technique microclonal reproduction phenomenon of apical dominance. Attention is focused on microclonal propagation of herbaceous and woody plants (growing of tropical and subtropical plants, technical, cereal, vegetable, fruit, berry and tree crops).

**Immune biotechnology.** Masters get fundamental knowledge in immunology and immunochemistry, get acquainted with the latest developments in the field of science and technology for development of immunological products – vaccines, immunoglobulins, serum diagnostics including the use of genetic engineering. Get knowledge about methods of state control safety and quality of immunological agents. Special part involves mastering molecular genetic and immunochemical methods of analysis and purification method for obtaining biopolymers, for example proteins and nucleic acids.

**Transport systems of plants** The course focuses on the study of genetic information during ontogeny. During the course students are introduced to morphological aspects of development, as well as biochemical and molecular genetic mechanisms that accompany them during embryonic and postnatal development. Particular attention is paid to the molecular-genetic aspects of the determination and differentiation of cells and their stability during ontogeny.

**Cell selection for resistant** The foundations and methods of resistant plants producing to biotic and abiotic factors, especially the mutagenesis and selection of mutants *in vitro*, nature and mechanisms of somaclonal variability, obtain the resistant lines to pesticides, temperature stressors, pathogens are studied. The attention is focused on the principles of obtaining mutants, using cell technologies and their application in the cell engineering; effects of stressors on the plants, nature and mechanism of resistance to individual substances; *in vitro* selection methods and uses of resistant variants to salinity, ionic stress, pesticides and plant pathogens; types and selection auxotrophic and ts-mutants; creating new forms of plants with selective marker signs.

*Optional Block 2.1 "DNA-certification and mapping the genome"*

**Diagnosis and identification of GMO, DNA certification.** The main purpose of discipline is the assimilation of theoretical foundations and practical formation of appropriate skills in the study of biological objects and genetically modified organisms, genotyping methods and techniques of agricultural plants and their DNA certification in accordance with modern scientific approaches, harmoniously combining the perception and understanding of practical and theoretical environmental knowledge for students and ecobiotechnological direction.

**Cellular and molecular biology.** The purpose of this course is to familiarize students with the current state of research and practical application fields of the discipline, course Objective is to build students' understanding of the unity of biological systems, resulting in structural and chemical similarities organization, and fundamental molecular processes that distinguish them from inanimate objects. Particular attention is given to mechanisms that ensure the preservation and realization of genetic information in the cell is the basic structure of any organism.

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**Genetic Engineering.** The purpose of this course is to familiarize students with current trends and challenges of genetic engineering methods of producing genetically modified organisms. Course description: creates a knowledge of methods of cloning DNA fragments structural features vectors from prokaryotes and eukaryotes, creating libraries genomes, restriction maps, obtaining drugs, obtaining transgenic plants and animals. As a result, the discipline master should be able to based on the latest achievements using the guidelines, plan and choose the optimal conditions for transformation of recombinant DNA and genetic material.

**Molecular virology.** The acquisition of the teoretical foundations and practical skills appropriate formation in the study of biological objects based on classical and modern scientific approaches. Special part of the discipline makes it possible to learn the basic techniques of working with infectious materials, create diagnostic test kits for the identification of viruses, the diagnosis, identification of viruses using molecular biology techniques, to carry out genetic manipulation of viruses analyze genetic sequences and trace phylogenetic relationships, the need for training highly qualified specialists biotechnological areas.

**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 | 1,5 year                                  |
| – Part-time                                      | 1,5 years                                 |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of Teaching                             | Ukrainian, English                        |
| Qualification                                    | Master in Plant Protection and Quarantine |

**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.

### 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., Horodyshe district, Mliev).

The State Veterinary and Phytosanitary Service of Ukraine and its regional units.

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 for Master Theses

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 cenoss 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>1. GENERAL TRAINING CYCLE</b>    |  |                   |                   |
| <b>Compulsory components of EPP</b> |  |                   |                   |
| CC 1                                | Business foreign language  | 3                 | exam              |
| CC 2                                | Methodology and organization of scientific research on the basics of intellectual property                           | 3                 | exam              |
| CC 3                                | Biosafety in Plant Protection  | 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 4  | Logistic and communications in Plant Protection  | 3                 | exam                |
| OC 5  | Economic and organization of agricultural service  | 3                 | exam                |
| Optional components of EPP  |  |                   |                     |
| Optional subjects by Student's Choice   |  |                   |                     |
| OB 1  | Optional components 1  | 4                 | exam                |
| OB 2  | Optional components 2  | 4                 | exam                |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE  |  |                   |                     |
| Compulsory components of EPP  |  |                   |                     |
| CC 6  | Complex systems of crop plant protection from diseases   | 4                 | exam                |
| CC 7  | Phytofagous insect management  | 4                 | exam                |
| CC 8  | Management of the number of drills in agricultural societies   | 4                 | exam                |
| CC 9  | International phytosanitary standards  | 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   | Epiphytotiology  | 3                 | exam                |
| CC 13   | Crop Seed pathology  | 3                 | exam                |
| CC 14   | Desinfection of Management objects   | 4                 | exam                |
| Optional components of EPP  |  |                   |                     |
| Optional Block of choice by specialty   |  |                   |                     |
| Optional Block 1 "Biological justification of obligate and facultative pathogens control" |  |                   |                     |
| OB 1.1  | Actinomitsetes diseases of plant   | 3                 | exam                |
| OB 1.2  | Physiological and biochemical aspects of plant resistance to disease   | 4                 | exam                |
| OB 1.3  | Mycotoxicology   | 3                 | exam                |
| OB 1.4  | Pathogenesis in plant production   | 3                 | exam                |
| OB 1.5  | Pathological process of plants' root system  | 3                 | exam                |
| Optional Block 2 "Phytosanitary monitoring and forecasting "                              |  |                   |                     |
| OB 2.1  | Insect pathology.  | 4                 | exam                |
| OB 2.2  | Insects ecology  | 4                 | exam                |
| OB 2.3  | Technical entomology   | 4                 | exam                |
| OB 2.4  | Insect physiology  | 4                 | exam                |
| The total amount of compulsory components   |  | 52                |                     |
| The total amount of optional components   |  | 24                |                     |
| 3. OTHER TYPES OF TRAINING  |  |                   |                     |
| CC 14   | Production Practice  | 6                 | differential credit |
| CC 15   | Preparation and defense of master's work   | 4                 | protection of work  |
| THE TOTAL AMOUNT OF EPP   |  | 90                |                     |

### Annotations of disciplines in the curriculum

#### 1. 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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Complex systems of crop plant protection from diseases.** Using the newest informational and specialized technologies of plant protection Against diseases. The control of development of diseases of field, vegetable and fruit crops and grape plantings are.

**Phytophagous insect management.** Phytophagous 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.

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

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**Management of the number of drills in agricultural societies.** Discipline studies 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 epiphytology 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 epiphytologies.

**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.

**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.

### **Optional components of EPP**

*Optional Block of choice by 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.

**Mycotoxology.** 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.

**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 "Phytopathological 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.

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

|  |   |
|--|---|
| Form of Training:                                | Licensed number of persons:               |
| – Full-time                                      | 50  |
| Duration of Training:                            |   |
| – Full-time educational and professional program | 1,5 year                                  |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of Teaching                             | Ukrainian, English                        |
| Qualification                                    | Master in Plant Protection and 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., Horodyshche district, Mliiev).

The State Veterinary and Phytosanitary Service of Ukraine and its regional units.

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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 for Master Theses

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 cenossiss 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 "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>1. 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  | 3                 | exam              |
| CC 4  | Economic and organization of agricultural service  | 3                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional components 1  | 4                 | exam              |
| OB 2  | Optional components 2  | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 5  | Integrated plant protection  | 4                 | exam              |
| CC 6  | External and internal plant quarantine.  | 4                 | exam              |
| CC 7  | Methods for inspection and examination of objects of regulation  | 4                 | exam              |
| CC 8  | Quarantine pests   | 6                 | exam              |
| CC 9  | International phytosanitary standards  | 4                 | exam              |
| CC 10   | Quarantine pest risk evaluation  | 4                 | exam              |
| CC 11   | Desinfection of Management objects   | 4                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional Block of choice by specialty</i>    |  |                   |                   |
| <i>Optional Block 1 "Quarantine of Plants"</i>  |  |                   |                   |

| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control   |
|--|--|-------------------|---------------------|
| OB 1.1   | Adventist pests  | 4                 | exam                |
| OB 1.2   | Phytopathology law and international cooperation   | 4                 | exam                |
| OB 1.3   | Geography quarantine organisms   | 4                 | exam                |
| OB 1.4   | Harmful organisms Ukraine in the international phytopathology  | 4                 | exam                |
| OB 1.5   | Quarantine of forest crops   | 5                 | exam                |
| <b>The total amount of compulsory components</b> |  | <b>44</b>         |                     |
| <b>The total amount of optional components</b>   |  | <b>29</b>         |                     |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                     |
| CC 14  | Production Practice  | 11                | differential credit |
| CC 15  | Preparation and defense of master's work   | 6                 | protection of work  |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                     |

### Annotations of disciplines in the curriculum

#### 1. 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.

## 2. 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.

**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 fitosanitary 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 fitosanitary measures which will influence minimum on the free trading plants and plants materials.

### Optional components of EPP

*Optional Block of choice by 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.

**Phytosanitary law and international cooperation.** Provides study phytosanitary rules of import from abroad, transportation within the country, and exports of agricultural

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products. Study on plant quarantine laws in Ukraine and familiarization with foreign experience that the regulation in phytosanitary field.

**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.

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

**Dean** – Kondratiuk Vadym Mykolayovych, Associated Professor, Candidate of Agricultural 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 sn educations programs with in 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: horse\_chair@twin.nauu.kiev.ua

Head of Department – Mykola Povochnikov, 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: natpp@meta.ua

Head of Department – Nataliia Prokopenko, Professor, Doctor of Agricultural Science.

**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: [aqua\\_chair@twin.nauu.kiev.ua](mailto:aqua_chair@twin.nauu.kiev.ua)

Head of Department – Vovk Nadiya, Professor, Doctor of Agricultural Science.

**Ichthyology and Hydrobiology**

Tel.: (044) 527-86-83

E-mail: [gidrobio@ukr.net](mailto:gidrobio@ukr.net)

Head of Department – Shevchenko Petro, Associated Professor, Candidate of Biological Science.

**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 | 1,5 years                            |
| – Part-time                                      | 1,5 years                            |
| Credits ECTS:                                    |                                      |
| – educational and professional program           | 90                                   |
| Language of Teaching                             | Ukrainian, English                   |
| Qualification                                    | Livestock products research engineer |

**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 predict efficiency of farm animals, evaluate genetic resources in the riding, trotting and

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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.

***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 for Master Theses

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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 1  | Occupational Health and Civil Defence in Livestock   | 3                 | exam              |
| CC 2  | Process control in livestock   | 3                 | exam              |
| CC 3  | Organization of agribusiness   | 3                 | exam              |
| CC 4  | Production management in livestock   | 3                 | exam              |
| CC 5  | Philosophical biological problems  | 3                 | credit            |
| CC 6  | Methodology and organization of scientific research on the basics of intellectual property                           | 3                 | exam              |
| CC 7  | Agricultural policy  | 3                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 3                 | exam              |
| OB 2  | Optional subject 2   | 3                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 8  | Biological productivity of farm animals  | 5                 | exam              |
| CC 9  | Animal nutrition and feed quality  | 4                 | exam              |
| CC 10   | Modern trends of selection in animal husbandry   | 3                 | exam              |
| CC 11   | Information technology in animal husbandry   | 3                 | exam              |
| CC 12   | Technology of production and processing of livestock products  | 10                | exam              |
| <b>Optional components of EPP</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 by speciality</i>   |   |                          |                          |
| <i>Optional Block 1 "Special livestock breeding"</i>                            |   |                          |                          |
| OB 1.1  | Biology of wild and exotic animals  | 4                        | exam                     |
| OB 1.2  | Management of biocoenosis   | 8                        | exam                     |
| OB 1.3  | Technology to protect wildlife  | 3                        | exam                     |
| OB 1.4  | Technology introduction and breeding animals  | 5                        | exam                     |
| <i>Optional Block 2 "Animal Feeding"</i>  |   |                          |                          |
| OB 2.1  | Evaluation of the quality and nutritive value of feeds  | 4                        | exam                     |
| OB 2.2  | Feeding of ruminant animals   | 6                        | exam                     |
| OB 2.3  | Feeding monogastric animals and poultry   | 6                        | exam                     |
| OB 2.4  | Feeding fish  | 4                        | exam                     |
| <i>Optional Block 3 "The racing industry and sport horse breeding industry"</i> |   |                          |                          |
| OB 3.1  | Global genetic horses resources   | 5                        | exam                     |
| OB 3.2  | Racetrack and sports training   | 5                        | exam                     |
| OB 3.3  | Horse-breeding  | 5                        | exam                     |
| OB 3.4  | Horse biology   | 5                        | exam                     |
| <i>Optional Block 4 "Technologies productive use of the capacity of bees"</i>   |   |                          |                          |
| OB 4.1  | Biology of bees   | 3                        | exam                     |
| OB 4.2  | Breeding and keeping of bees  | 8                        | exam                     |
| OB 4.3  | Production, storage and processing of bee products  | 5                        | exam                     |
| OB 4.4  | Technological equipment in beekeeping   | 4                        | exam                     |
| <i>Optional Block 5 "Save and use of breeding resources"</i>                    |   |                          |                          |
| OB 5.1  | Management of the selection process in livestock  | 5                        | exam                     |
| OB 5.2  | Keeping of livestock genetic resources  | 7                        | exam                     |
| OB 5.3  | Biotechnology of animal reproduction  | 4                        | exam                     |
| OB 5.4  | Genetics of quantitative and qualitative characteristics of animals   | 4                        | exam                     |
| <i>Optional Block 6 "Reproductive bio engineering"</i>                          |   |                          |                          |
| OB 6.1  | Contemporary methods of regulating animals reproductive capacity  | 6                        | exam                     |
| OB 6.2  | Biotechnological methods in livestock raising   | 6                        | exam                     |
| OB 6.3  | Conservation of livestock genetic resources   | 4                        | exam                     |
| OB 6.4  | The genetics of qualitative and quantitative features   | 4                        | exam                     |
| <i>Optional Block 7 "Dairy cattle breeding"</i>                                 |   |                          |                          |
| OB 7.1  | Physiology of lactation   | 4                        | exam                     |
| OB 7.2  | Management of milk productivity   | 4                        | exam                     |
| OB 7.3  | Intensive technologies of rearing young cattle stock  | 4                        | exam                     |
| OB 7.4  | Management and marketing in dairy farming   | 8                        | exam                     |
| <i>Optional Block 8 "Specialized beef cattle"</i>                               |   |                          |                          |
| OB 8.1  | Management of productivity  | 4                        | exam                     |
| OB 8.2  | Control of production of products beef cattle   | 8                        | exam                     |
| OB 8.3  | Processing beef cattle  | 4                        | exam                     |
| OB 8.4  | Production of ecologically pure beef  | 4                        | exam                     |
| <i>Optional Block 9 "Technology management in pig farming"</i>                  |   |                          |                          |
| OB 9.1  | Biology of the pigs   | 4                        | exam                     |
| OB 9.2  | Management of feeding and housing pigs  | 5                        | exam                     |
| OB 9.3  | Slaughtering pigs and pig of products processing  | 5                        | exam                     |
| OB 9.4  | Industrial pig production technology  | 6                        | exam                     |
| <i>Optional Block 10 "Modern technologies of industrial poultry"</i>            |   |                          |                          |
| OB 10.1   | Technology of production of eggs and meat   | 7                        | exam                     |
| OB 10.2   | Breeding business   | 5                        | exam                     |
| OB 10.3   | Incubation of the birds eggs  | 3                        | exam                     |
| OB 10.4   | Bird biology  | 5                        | exam                     |
| <i>Optional Block 11 "Technologies in rabbit breeding and bestiality"</i>       |   |                          |                          |
| OB 11.1   | Biology of rabbits and fur animals  | 6                        | exam                     |

| Code n/a  | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|---|--|-------------------|-------------------|
| OB 11.2   | Management of feeding rabbits and fur animals  | 5                 | exam              |
| OB 11.3   | Modern technologies in rabbit breeding and fur farming   | 5                 | exam              |
| OB 11.4   | Breeding in rabbit breeding and fur farming  | 4                 | exam              |
| <i>Optional Block 12 "Technologies of sheep and goat breeding "</i> |  |                   |                   |
| OB 12.1   | Biology of sheep and goat  | 5                 | exam              |
| OB 12.2   | Technologies of production sheep and goat products   | 7                 | exam              |
| OB 12.3   | Sheep and goat stockbreeding   | 5                 | exam              |
| OB 12.4   | Reproduction of sheep and goats  | 3                 | exam              |
| <b>The total amount of compulsory components</b>                    |  | <b>46</b>         |                   |
| <b>The total amount of optional components</b>                      |  | <b>26</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                                   |  |                   |                   |
| CC 1  | Production Practice  | 8                 |                   |
| CC 2  | Complex qualifying exam<br>Preparation and defense of master's work  | 10                |                   |
| <b>THE TOTAL AMOUNT OFF EPP</b>                                     |  | <b>90</b>         |                   |

## Annotations of disciplines in the curriculum

### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Occupational safety and civil protection in animal husbandry.** Cultivates the ability and competence to conduct effective management of labor and improve working conditions on the basis of scientific and technological progress and international experience, and promotes awareness of the indissoluble unity of successful professional activity with mandatory compliance with all safety requirements in a particular area. Studies international standards on safety, basic laws and regulations on health and safety in the field of system safety management in the organization, injuries and diseases in the area, investigate accidents, the main measures of fire prevention for industrial facilities. Examines the organization and to protect the population from the consequences of emergencies, economic, natural, environmental; prevention of emergency situations, the measures to reduce losses; 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 an emergency.

**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.

**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.

**Philosophical biological problems.** Students are able to learn about ways of fostering polyphony and pluralism of contemporary philosophical thinking in order to enlarge holistic worldview. Students will learn about world and Ukrainian philosophical view and to become aware of philosophical principles of the specialty.

**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.

**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.

## 2. 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.

**Information technology in animal husbandry.** The discipline provides students with a system of theoretical knowledge and practical skills in modern software used in agricultural production sector, including livestock breeding industry.

**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.

### **Optional components of EPP**

#### *Optional Block by speciality*

#### *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

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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.

*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.

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**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 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

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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 sterily 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.

**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,

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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.

#### *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.

**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 proses; 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 shearing 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 | 1,5 years                  |
| – Part-time                                      | 1,5 years                  |
| Credits ECTS:                                    |                            |
| – educational and professional program           | 90                         |
| Language of Teaching                             | Ukrainian, English         |
| Qualification                                    | Aquaculture researcher     |

**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.

**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 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 waters"***

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 continental reservoirs"***

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 "Ukrtryba"; 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 "Commercial aquaculture"***

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.

**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 "Ukrtryba"; Research Institute of Fisheries.

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### ***Optional Block "Pond aquaculture"***

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.

### **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 "Kyivrybosp", SE "Irkliiv Fishpond", SE "Ukrryba", DG "Great Lubin", PJSC "Hmelnytskrybosp", PE "Aquarium Technologies", PJSC "Sumyrybosp", PJSC "Hersonrybosp", JSC "Vilshanka", ARC "Kherson Fishermen", PJSC "Poltavarybosp", Fishing Farm "Nyvka", IRG NAAS of Ukraine, JSC "Chernihivrybosp", Astrakhan State Technical University (Astrakhan, Russia) and the Louis Pasteur National Lyceum (France) and others.

### Proposed Topics for Master Theses

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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 1  | Occupational Health and Civil Defence in fishing industry  | 3                 | exam              |
| CC 2  | Communication in the fish farming collectives  | 3                 | exam              |
| CC 3  | Economics of fisheries sector  | 3                 | exam              |
| CC 4  | Production management in fishery   | 3                 | exam              |
| CC 5  | Philosophical biological problems  | 3                 | credit            |
| CC 6  | Methodology and organization of scientific research on the basics of intellectual property                           | 3                 | exam              |
| CC 7  | Agricultural policy  | 3                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 3                 | exam              |
| OB 2  | Optional subject 2   | 3                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 8  | Information technologies in fish farming   | 4                 | exam              |
| CC 9  | Theoretical foundations of fish farming  | 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 10  | Theory of fish population dynamics  | 5                        | exam                     |
| CC 11  | Intensive aquaculture technologies  | 5                        | exam                     |
| CC 12  | Fisheries research methods  | 3                        | exam                     |
| CC 13  | Environmental physiology and biochemistry of aquatic organisms  | 3                        |                          |
| <b>Optional components of EPP</b>                                |   |                          |                          |
| <i>Optional Block by speciality</i>                              |   |                          |                          |
| <i>Optional Block 1 "The fauna of the wetlands"</i>              |   |                          |                          |
| OB 1.1   | Biology of productivity objects wetland fauna   | 5                        | exam                     |
| OB 1.2   | Trofology and animal reproduction   | 5                        | exam                     |
| OB 1.3   | Biomonitoring and protection of wetland fauna   | 4                        | exam                     |
| OB 1.4   | Resource management of wetland fauna  | 6                        | exam                     |
| <i>Optional Block 2 "Protection of hydrobioresources"</i>        |   |                          |                          |
| OB 2.1   | Assessment of the ecological state of water bodies  | 5                        | exam                     |
| OB 2.2   | Protection of water resources   | 5                        | exam                     |
| OB 2.3   | Protection of aquatic organisms   | 5                        | exam                     |
| OB 2.4   | Management of of aquatic organisms  | 5                        | exam                     |
| <i>Optional Block 3 "Harvested hydrobiological resources"</i>    |   |                          |                          |
| OB 3.1   | Industrial ichthyology  | 5                        | exam                     |
| OB 3.2   | International regulation of fishing   | 5                        | exam                     |
| OB 3.3   | Managing fish productivity of reservoirs  | 5                        | exam                     |
| OB 3.4   | Forecasting of productivity of reservoirs   | 5                        | exam                     |
| <i>Optional Block 4 "Bioproductivity of waters"</i>              |   |                          |                          |
| OB 4.1   | Hydrobiofacies  | 5                        | exam                     |
| OB 4.2   | The bioproductivity of waters   | 5                        | exam                     |
| OB 4.3   | The methodology of evaluation of water bioproductivity  | 5                        | exam                     |
| OB 4.4   | Management of water productivity  | 5                        | exam                     |
| <i>Optional Block 5 "Ornamental aquatic bioresources"</i>        |   |                          |                          |
| OB 5.1   | World ornamental aquatic bioresources   | 4                        | exam                     |
| OB 5.2   | Cultivation technology of ornamental aquatic bioresources   | 6                        | exam                     |
| OB 5.3   | Health of ornamental aquatic organisms  | 4                        | exam                     |
| OB 5.4   | Aquatic design and ornamental aquatic systems construction  | 6                        | exam                     |
| <i>Optional Block 6 "Ichthyofauna of continental reservoirs"</i> |   |                          |                          |
| OB 6.1   | Modern methods of ichthyological research   | 4                        | exam                     |
| OB 6.2   | Native ichthyofauna of continental reservoirs   | 6                        | exam                     |
| OB 6.3   | Ichthyofauna of Ukrainian ponds   | 5                        | exam                     |
| OB 6.4   | Ichtyocenology  | 5                        | exam                     |
| <i>Optional Block 7 "Commercial aquaculture"</i>                 |   |                          |                          |
| OB 7.1   | Productivity biology of commercial aquaculture facilities   | 4                        | exam                     |
| OB 7.2   | Technical equipment of commercial aquaculture   | 5                        | exam                     |
| OB 7.3   | Technologies of commercial aquaculture  | 6                        | exam                     |
| OB 7.4   | The selection of objects for commercial aquaculture   | 5                        | exam                     |
| <i>Optional Block 8 "Pond aquaculture"</i>                       |   |                          |                          |
| OB 8.1   | Productivity biology of pond aquaculture facilities   | 4                        | exam                     |
| OB 8.2   | Technologies of pond aquaculture  | 5                        | exam                     |
| OB 8.3   | Technologies for cultivating additional pond aquaculture facilities   | 6                        | exam                     |
| OB 8.4   | The selection of objects for pond aquaculture   | 5                        | exam                     |
| <i>Optional Block 9 "Sturgeon breeding"</i>                      |   |                          |                          |
| OB 9.1   | Biological productivity of sturgeon species   | 4                        | exam                     |
| OB 9.2   | Selection of sturgeon breeding objects  | 5                        | exam                     |
| OB 9.3   | Sturgeon husbandry in ponds   | 5                        | exam                     |
| OB 9.4   | Industrial sturgeon   | 6                        | exam                     |
| <i>Optional Block 10 "Salmon breeding"</i>                       |   |                          |                          |
| OB 10.1  | Biological productivity of salmon species   | 4                        | exam                     |



| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|--|--|-------------------|-------------------|
| OB 10.2  | Selection of salmon breeding objects   | 5                 | exam              |
| OB 10.3  | Salmon husbandry in ponds  | 5                 | exam              |
| OB 10.4  | Industrial salmon  | 6                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>46</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>26</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 14  | Production Practice  | 8                 |                   |
| CC 15  | Complex qualifying exam<br>Preparation and defense of master's work  | 10                |                   |
| <b>THE TOTAL AMOUNT OFF EPP</b>                  |  | <b>90</b>         |                   |

### Annotations of disciplines in the curriculum

#### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Occupational health and Civil Defense in fishing industry.** The discipline examines the ways of setting up protection measures and protecting the public against the effects of economic, natural and environmental emergencies; prevent emergencies; reduce losses; disseminate threat alerts; provide life support during accidents, major fires, natural calamities and disasters, military conflicts; conduct rescue operations; forecast, monitor and control radioactive and chemical contamination; ensure sustainability of agricultural facilities in emergency situations. This is a regulatory discipline that is taught to develop in the future professionals holding the master's degree the knowledge about current status and issues in the field of labor safety in the fishery sector adjusted to the priorities of their basic training. It summarizes organizational requirements of inter-sectoral and industrial safety regulations (NPAOP – Ukrainian Labor Protection Regulations) to be implemented in fishery enterprises at safety management units; requirements to setting up and operating at businesses and enterprises the labor protection services; ways, methods and means of enforcing environment and labor protection regulations during technological processes in the fishing industry to adopt managerial decisions to prevent accidents, injuries and occupational diseases in the industry.

**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.

**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.

**Philosophical biological problems.** Students are able to learn about ways of fostering polyphony and pluralism of contemporary philosophical thinking in order to enlarge holistic worldview. Students will learn about world and Ukrainian philosophical view and to become aware of philosophical principles of the specialty.

**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.

**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.

## 2. SPECIAL (PROFESSIONAL) 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 процеси рибництва з урахуванням індивідуальних особливостей особистості; проявляти лідерські якості та професійну компетентність в управлінні рибницькими колективами; організовувати ділове спілкування, попереджувати і врегульовувати виробничі конфлікти в колективах рибницьких підприємств; to manage personnel policies, to promote the image and professional ethics of specialists and fisheries.

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**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.

**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 current environment with regard to trends in global fish market, available resources, increasing fishery production and aquaculture.

**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.

### **Optional components of EPP**

*Optional Block by speciality*

*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: marshlands, scienega, 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

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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 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 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.

**Protection of water resources.** The course studies ways of pollution of continental waters (mechanical, chemical, bacterial, biological, radioactive, thermal, etc.) which lead to changes in physical, chemical and biological properties of the water in the water reservoirs, making the water there unsafe to consume, causing damage to the national economy, health and safety of the population. Students also study activities and measures to protect water resources and aquatic rehabilitation continental basins as well as legal regulation of protection of water resources and mathods of wastewater treatment (mechanical, chemical, physical-chemical and biological, or when they are used together, combined).

**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

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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 ichthyofauna 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 ichthyofauna variety of natural and natural and technical (reservoirs) continental waters of Ukraine on the basis of a clear strategy and tactics of management of domestic reservoirs of various 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 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

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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 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 continental reservoirs"*

**Modern methods of ichthyological research.** This is a comprehensive professional applied discipline for ichthyologists and fish breeders. It generalizes and extends the hydrological, hydrochemical, ichthyological research methods in fish husbandry.

**Aboriginal ichthyofauna of continental reservoirs.** It studies the species of fish of any reservoir that originated and evolved in a particular area, its indigenous inhabitants. The study of the discipline is necessary to prevent the causes of mass death of fish, improve technologies for artificial reproduction of industrially valuable species, rare and endangered fish species, create optimal conditions for natural and artificial reproduction of fish to restore, preserve and protect valuable industrial herds of aboriginal fish species.

**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

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Ukraine's inland waters, Azov and Black Seas, and the current classification system for ichthyo 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 "Commercial aquaculture"*

**Productivity biology of commercial aquaculture facilities.** Students will learn about ecological and biological peculiarities of main objects of commercial 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.

**Technical equipment of commercial aquaculture.** Students will learn about effective use of technical equipment of aquaculture complexes and fisheries, types of general characteristics of types of equipment to grow fish, technological regimes of exploiting equipment, how to calculate the equipment necessary to fulfill specific tasks.

**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.

**The selection of objects for commercial aquaculture.** Students will learn about fish productive properties when grown for commercial fisheries; modern methods of fish selection in order to form and consolidation economically and hereditary useful properties of aqua culture 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.

*Optional Block 8 "Pond aquaculture"*

**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.

**Technologies of pond aquaculture.** Students will learn about technologies of reproduction and growing aquaculture objects; innovative technologies in pond fishing; new methods of breeding and cultivating fish in European Union, the USA, Canada, China, etc.; integrated technologies in fisheries.

**Technical equipment of pond aquaculture.** Students will learn about effective use of technical equipment of aquaculture complexes and fisheries, types of general characteristics of types of equipment to grow fish, technological regimes of exploiting equipment, how to calculate the equipment necessary to fulfill specific tasks.

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**The selection of objects for pond 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 aqua culture 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.

*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 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

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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.

## **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" (1,5 years)***

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

Tel.: (044) 527-86-17

E-mail: kvk21@ukr.net

#### ***Educational-professional program "Veterinary medicine" (6 years)***

Guarantor of the program – Dukhnitsky Vladimir Bogdanovich, Doctor of Veterinary Sciences, Professor of the department Pharmacology, parasitology and tropical veterinary

Тел.: (044) 527-83-65

E-mail: parma@nubip.edu.ua

Graduating departments:

**Anatomy, histology and pathomorphology animal named after acad. V.G. Kasyanenko**

Тел.: (044) 527-86-17

E-mail: museum@nubip.edu.ua

Head of Department – Doctor of Veterinary Sciences, Professor Melnyk Oleg Petrovych

#### **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 Valchuk Oleksandr Anatoliyovych

#### **Epizootiology, microbiology and virology**

Tel.: (044) 527-80-10

E-mail: epizootology@nubip.edu.ua

Head of Department - Candidate of Veterinary Sciences, Associate Professor Melnyk Volodymyr Vasylovych

**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  
Ishschenko Vadym Dmytrovych

**Therapy and clinical diagnosis**

Tel.: (044) 527-87-92

E-mail: kostenko\_vm@nubip.edu.ua

Head of Department - Candidate of Veterinary Science, Associate Professor  
Kostenko Vitalii Mykhaylovych

**Surgery and pathophysiology named prof. I.O Povazhenka**

Tel.: (044) 527-88-68

E-mail: chirurgia@nubip.edu.ua

Head of Department - Doctor of Veterinary Sciences, Associate Professor Malyuk  
Mykola Oleksiyovych

**Veterinary hygiene named prof. A.K. Skorokhodko**

Tel.: (044) 527-81-56

E-mail: kucheruk\_md@nubip.edu.ua

Head of Department - Candidate of Veterinary Science, Associate Professor  
Kucheruk Mariia Dmitryvna

**Specialty 212 "Veterinary hygiene, sanitary and expertise"**

***Educational-professional program "Veterinary hygiene, sanitary and expertise" (1,5 years)***

Guarantor of the program – Shevchenko Larisa Vasylivna, Doctor of Veterinary Sciences, Professor of the department Veterinary hygiene named prof. A.K. Skorokhodko

Tel.: (044) 258 -03-15

E-mail: shevchenko\_laris@ukr.net

***Educational-professional program "Veterinary hygiene, sanitary and expertise" (6 years)***

Guarantor of the program – Zasekin Dmitry Adamovich, Doctor of Veterinary Sciences, Professor of the department Veterinary hygiene named prof. A.K. Skorokhodko

Tel.: (044) 527 -80-41

E-mail: ndizdvtv@gmail.com

Graduating department:

**Veterinary hygiene named prof. A.K. Skorokhodko**

Tel.: (044) 527-81-56

E-mail: kucheruk\_md@nubip.edu.ua

Head of Department - Candidate of Veterinary Science, Associate Professor  
Kucheruk Mariia Dmitryvna

**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 | 1,5 years                     |
| 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.

**Sphere of graduates employment**

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.

**Sphere of graduates employment**

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.



***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.

**Sphere of graduates employment**

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.

**Sphere of graduates employment**

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.

**Sphere of graduates employment**

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.

### **Sphere of graduates employment**

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.

### **Sphere of graduates employment**

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 basis for practical training.

### Proposed Topics for Master Theses

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<br>n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits ECTS | The final<br>control |
|--|---|---------------------------|----------------------|
| <b>1. 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<br>basics of intellectual property   | 4                         | test                 |
| <b>Optional components of EPP</b>  |   |                           |                      |
| <i>Optional subjects by Student's Choice</i>   |   |                           |                      |
| OB 1   | Optional subject 1  | 3                         | test                 |
| OB 2   | Optional subject 2  | 3                         | test                 |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |   |                           |                      |
| <b>Compulsory components of EPP</b>  |   |                           |                      |
| CC 4.  | Obstetrics, gynecology and animal reproduction<br>biotechnology   | 5                         | exam                 |
| CC 5.  | Special propaedeutics, therapy and prevention of internal<br>animal diseases  | 6                         | exam                 |
| CC 6.  | Surgical diseases with anesthesiology   | 5                         | test                 |
| CC 7.  | Special epizootology  | 5                         | exam                 |
| CC 8.  | Global parasitology   | 5                         | exam                 |
| CC 9.  | State Veterinary and Sanitary Expertise   | 5                         | test                 |
| CC 10.   | Comparative morphology, special pathomorphology and<br>forensic veterinary medicine   | 5                         | exam                 |
| <b>Optional components of EPP</b>  |   |                           |                      |
| <i>Optional Block by specialty</i>   |   |                           |                      |
| <i>Optional Block 1. "Preventive veterinary technologies of Animal Health Providing"</i> |   |                           |                      |
| OB 1.1.  | Preventive technologies to ensure the health of productive<br>animals   | 13                        | exam                 |
| OB 1.2.  | Preventive technologies to ensure the health of horses  | 3                         | exam                 |
| OB 1.3.  | Preventive technologies to ensure the health of small<br>animals  | 4                         | exam                 |
| <i>Optional Block 2 "Veterinary welfare of cattle, sheep and goats"</i>                  |   |                           |                      |

**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> |
|---|--|-------------------------------|--------------------------|
| OB 2.1.   | Innovative technologies nutrition, genetics and breeding of cattle, sheep and goats  | 4                             | exam                     |
| OB 2.2.   | Preventive veterinary technology non-communicable diseases of ruminants  | 10                            | exam                     |
| OB 2.3.   | Preventive veterinary technology communicable diseases of ruminants  | 6                             | exam                     |
| <i>Optional Block 3 "Veterinary welfare of dogs and cats"</i>                                 |  |                               |                          |
| OB 3.1  | Innovative technologies nutrition, genetics and dogs and cats breeding   | 4                             | exam                     |
| OB 3.2  | Preventive veterinary technology non-communicable diseases of dogs and cats  | 10                            | exam                     |
| OB 3.3  | Preventive veterinary technology contagious disease of dogs and cats   | 6                             | exam                     |
| <i>Optional Block 4 "Veterinary providing of pig breeding"</i>                                |  |                               |                          |
| OB 4.1.   | Innovative technologies nutrition, genetics and breeding pig   | 4                             | exam                     |
| OB 4.2.   | Preventive veterinary technology non-communicable diseases of pigs   | 10                            | exam                     |
| OB 4.3.   | Preventive Veterinary Technology contagious disease of pigs  | 6                             | exam                     |
| <i>Optional Block 5 "Veterinary Pharmacy"</i>   |  |                               |                          |
| OB 5.1.   | Pharmacognosy, Pharmaceutical Chemistry and Toxicological Chemistry  | 6                             | exam                     |
| OB 5.2.   | Pharmacy and pharmaceutical technology   | 6                             | test                     |
| OB 5.3.   | Clinical Veterinary Pharmacology and Clinical Veterinary Pharmacy  | 4                             | exam                     |
| OB 5.4.   | Preclinical and clinical studies of drugs  | 4                             | test                     |
| <i>Optional Block 6 "Veterinary and sanitary expertise of agricultural and food products"</i> |  |                               |                          |
| OB 6.1  | Food and feed hygiene  | 8                             | exam                     |
| OB 6.2  | Methods of veterinary and sanitary examination   | 4                             | exam                     |
| OB 6.3  | Quality management of the laboratory   | 3                             | exam                     |
| OB 6.4  | Food Risk Analysis   | 5                             | exam                     |
| <i>Optional Block 7 "Veterinary Laboratory Diagnostics"</i>                                   |  |                               |                          |
| OB 7.1  | Quality management of the laboratory   | 3                             | test                     |
| OB 7.2  | Clinical laboratory diagnostics  | 7                             | exam                     |
| OB 7.3  | Laboratory Diagnosis of Infective Diseases   | 7                             | exam                     |
| OB 7.4  | Pathomorphological diagnosis   | 3                             | test                     |
| <b>The total amount of compulsory components</b>  |  | <b>49</b>                     |                          |
| <b>The total amount of optional components</b>  |  | <b>26</b>                     |                          |
| <b>3. OTHER TYPES OF TRAINING</b>   |  |                               |                          |
| CC 11   | Production practice  | <b>10</b>                     | test                     |
| CC 12   | Preparation and defense of master's work   | <b>5</b>                      | Protection of work       |
| <b>THE TOTAL AMOUNT OF EPP</b>  |  | <b>90</b>                     |                          |

**Annotations of disciplines in the curriculum**

**1. 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.

## 2. 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 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

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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**

#### *Optional Block by 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.

#### *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.

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**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 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.

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*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 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

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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.

**Annotation «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 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

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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.

**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.

**Sphere of graduates employment**

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.

**Sphere of graduates employment**

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.

***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.

**Sphere of graduates employment**

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.

**Sphere of graduates employment**

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.

**Sphere of graduates employment**

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 and applied 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.



### Sphere of graduates' employment

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.

### Proposed Topics for Master Theses

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<br>n/a   | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits ECTS | The final<br>control |
|---|---|---------------------------|----------------------|
| 1. GENERAL TRAINING CYCLE   |   |                           |                      |
| Compulsory components EPP   |   |                           |                      |
| 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                 |
| Total   |   | 20                        |                      |
| Compulsory components EPP by decision of the Academic Council of the University |   |                           |                      |

**MASTER CURRICULA AND TRAINING PROGRAMS**

| Code<br>n/a                               | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits ECTS | The final<br>control |
|---|---|---------------------------|----------------------|
| CCU 1.                                    | History of Ukrainian nationhood   | 4                         | exam                 |
| CCU 2.                                    | Etnoculturology   | 4                         | test                 |
| CCU 3.                                    | Ukrainian language (for professional purposes)  | 4                         | exam                 |
| CCU 4.                                    | Philosophy  | 4                         | exam                 |
| CCU 5.                                    | Foreign Language  | 5                         | exam                 |
| CCU 6.                                    | Physical Education  |                           | test                 |
| CCU 7.                                    | Agricultural policy   | 4                         | test                 |
| CCU 8.                                    | Life safety   | 3                         | exam                 |
| CCU 9.                                    | Methodology and organization of scientific research on the<br>basics of intellectual property   | 4                         | test                 |
| CCU 10.                                   | Business foreign language   | 4                         | test                 |
| CCU 11.                                   | Personal legal culture  | 3                         | test                 |
| Total                                     |   | 39                        |                      |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE  |   |                           |                      |
| Compulsory components EPP                 |   |                           |                      |
| CC 6.                                     | History of veterinary medicine  | 3                         | test                 |
| CC 7.                                     | Ecology in veterinary medicine  | 4                         | test                 |
| CC 8.                                     | Animal anatomy  | 9                         | exam                 |
| CC 9.                                     | Cytology, histology, embryology   | 7                         | exam                 |
| CC 10.                                    | Basics of breeding animals  | 4                         | test                 |
| CC 11.                                    | Veterinary microbiology   | 5                         | exam                 |
| CC 12.                                    | Biochemistry of animails with basics of physical and colloid<br>chemistry   | 6                         | exam                 |
| CC 13.                                    | Physiology of animals   | 6                         | exam                 |
| CC 14.                                    | Animal alimentation   | 4                         | test                 |
| CC 15.                                    | Veterinary immunology   | 4                         | test                 |
| CC 16.                                    | Veterinary virology   | 4                         | exam                 |
| CC 17.                                    | Hygiene of animals  | 5                         | exam                 |
| CC 18.                                    | Animal welfare, ethology and professional ethics  | 4                         | test                 |
| CC 19.                                    | Pathological physiology   | 7                         | exam                 |
| CC 20.                                    | Operative surgery, topographic anatomy and<br>anesthesiology  | 7                         | exam                 |
| CC 21.                                    | Clinical diagnostic of internal diseases of animals   | 7                         | exam                 |
| CC 22.                                    | Veterinary Pharmacology   | 7                         | exam                 |
| CC 23.                                    | Pathological anatomy and forensic veterinary  | 8                         | exam                 |
| CC 24.                                    | Parasitology and invasive disease   | 7                         | exam                 |
| CC 25.                                    | Veterinary radiobiology   | 4                         | test                 |
| CC 26.                                    | Veterinary Clinical biochemistry  | 4                         | test                 |
| CC 27.                                    | Obstetrics, gynecology and animal reproduction<br>biotechnology   | 8                         | exam                 |
| CC 28.                                    | Veterinary toxicology   | 4                         | test                 |
| CC 29.                                    | General and special surgery   | 7                         | exam                 |
| CC 30.                                    | Food Safety and Hygiene   | 6                         | test                 |
| CC 31.                                    | Domestic animal diseases  | 10                        | exam                 |
| CC 32.                                    | Epizootology and infectious diseases  | 10                        | exam                 |
| CC 33.                                    | Organisation of veterinary business, national and<br>international veterinary regulations   | 5                         | exam                 |
| Total                                     |   | 166                       |                      |
| The total amount of Compulsory components |   | 225                       |                      |
| Optional components EPP                   |   |                           |                      |
| Optional subjects by specialty (block 1)  |   |                           |                      |
| OB 1.1                                    | Neurophysiology with the basics of zoopsychology  | 4                         | test                 |
| OB 1.2                                    | Andrology   | 4                         | test                 |
| OB 1.3                                    | Veterinary nephrology and urology   | 4                         | test                 |
| OB 1.4                                    | Veterinary and Sanitary Microbiology  | 4                         | test                 |
| OB 1.5                                    | Politology  | 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> |
|---|--|-------------------------------|--------------------------|
| OB 1.6  | Veterinary cardiology  | 4                             | test                     |
| OB 1.7  | Medicinal plants   | 4                             | test                     |
| OB 1.8  | Anesthesiology   | 4                             | test                     |
| OB 1.9  | Veterinary and Sanitary Virology   | 4                             | test                     |
| OB 1.10   | Management and Marketing in Veterinary Medicine  | 4                             | test                     |
| OB 1.11   | Bee Anatomy and Physiology   | 4                             | test                     |
| OB 1.12   | Cell technology in veterinary medicine   | 4                             | test                     |
| OB 1.13   | Dermatology of horses  | 4                             | test                     |
| OB 1.14   | Veterinary Nephrology and urology  | 4                             | test                     |
| OB 1.15   | Fundamentals of the veterinary pharmacy  | 4                             | test                     |
| OB 1.16   | Veterinary X-ray and diagnostics   | 4                             | test                     |
| OB 1.17   | Veterinary haematology   | 4                             | test                     |
| OB 1.18   | Veterinary Transfusiology  | 4                             | test                     |
| OB 1.19   | Veterinary endocrinology   | 4                             | test                     |
| OB 1.20   | Dentistry of dogs and cats   | 4                             | test                     |
| OB 1.21   | Ultrasound diagnosis and endoscopy   | 4                             | test                     |
| OB 1.22   | Veterinary Oncology  | 4                             | test                     |
| OB 1.23   | Clinical pharmacology  | 4                             | exam                     |
| OB 1.24   | Veterinary business organization   | 4                             | exam                     |
| OB 1.25   | Clinical neurology and animals behavior correction.  | 4                             | exam                     |
| OB 1.26   | Intensive care and resuscitation of animals  | 4                             | exam                     |
| <b>Total</b>                                    |  | <b>34</b>                     |                          |
| <i>Optional subjects by specialty (block 2)</i> |  |                               |                          |
| OB 2.1  | Preventive veterinary technologies of Animal Health Providing  | 50                            | exam                     |
| OB 2.2  | Veterinary welfare of cattle, sheep and goats  | 50                            | exam                     |
| OB 2.3  | Veterinary welfare of dogs and cats  | 50                            | exam                     |
| OB 2.4  | Veterinary Laboratory Diagnostics  | 50                            | exam                     |
| OB 2.5  | Veterinary Pharmacy  | 50                            | exam                     |
| OB 2.6  | Scientific-fundamental and applied problems of veterinary medicine   | 50                            | exam                     |
| <b>Total</b>                                    |  | <b>50</b>                     |                          |
| <i>Optional subjects by Student's Choice</i>    |  |                               |                          |
| OB 1  | Nutrition and maintenance of small pets  | 3                             | test                     |
| OB 2  | Food Safety and Quality  | 3                             | test                     |
| <b>Total</b>                                    |  | <b>6</b>                      |                          |
| <b>The total amount of Optional components:</b> |  | <b>90</b>                     |                          |
| <b>3. OTHER TYPES OF TRAINING</b>               |  |                               |                          |
| CC 34   | Educational practice   | 20                            | test                     |
| CC 35   | Practical training   | 14                            | test                     |
| CC 36   | Term papers  | 8                             | test                     |
| CC 37   | Preparation and defense of master's work   | 3                             | Protection of works      |
| <b>THE TOTAL AMOUNT OF EPP</b>                  |  | <b>360</b>                    |                          |

**Annotation of disciplines in the curriculum**

**1. GENERAL TRAINING CYCLE  
Compulsory components 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.

### **Compulsory components EPP by decision of the Academic Council of the University**

**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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components 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.



**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.

**Veterinary 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**

*Optional subjects by specialty (block 1)*

**Neurophysiology with the basics of zoopsychology.** Discipline that studies physiological processes in the nervous system as a substrate of mental activity; the

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functioning of the nervous system and its main structural unit - the neuron; membrane potential, action potential, biocurrents of the brain; membrane and cytoplasmic proteins; interaction of neurons; properties of the cortex of the cerebral hemisphere; reflex activity of the nervous system; properties of nerve centers; coordination of reflex processes; neural mechanisms of convergence, divergence, irradiation of excitement; positive and negative sequential induction; physiology of sensory systems; higher nervous activity of animals; classification and significance of conditioned reflexes, methods of their formation, physiological mechanism of the formation of conditioned reflexes, inhibition of conditioned reflex activity, analytical and synthetic activity of the cortex of the cerebral hemispheres, types of higher nervous activity, dynamic stereotype, signaling systems, motives of behavior, emotions and memory, classification of biological forms of animal behavior, physiological mechanisms of mental activity.

**Andrology.** The discipline examines the physiology and pathology of the genital system of males of different species of animals, the etiology, pathogenesis and modern clinical and laboratory methods for diagnosing the pathology of the reproductive system of males, the effectiveness of the methods of treatment and prevention of andrological diseases.

**Veterinary nephrology and urology.** Physiology of urine production. Diseases of urinary tract in domestic animals, etiology, pathogenesis, symptoms, diagnostic approach (urinalysis, ultrasound examination, plain and contrast X-ray, CT- and MRI-imaging), management of these disease and prevention.

**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.

**Politology.** Politics as a particular social phenomenon, Ukrainian political science, its main and dominant and Ukrainian political thought in general.

**Veterinary cardiology.** The course studies the distribution, etiology, pathogenesis, symptoms, diagnosis and modern approaches of treatment of animals with disorders of the cardiovascular system. The development of the discipline will enable the use of modern methods of diagnosis and therapy tools for diseases of the cardiovascular system among animals.

**Medicinal plants.** The flora of the planet and Ukraine, medicinal and poisonous flora; Collecting and harvesting of medicinal plant raw materials, processing technology and processing, chemical composition, pharmacological action, purpose, dosage forms, dosage, indications and contraindications for use.

**Anesthesiology.** Anesthesiology studies various types, methods and means of general and local anesthetics of animals, modern methods of controlling the condition of animals during anesthetic support and possible complications, means and methods of correction of critical states of an animal organism during anesthetic.

**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.

**Management and Marketing in Veterinary Medicine.** Business plan: preparation and execution. The organization of the enterprise. Marketing operations.

**Bee Anatomy and Physiology.** To better understand pathogenesis and cyclic diseases of bees, students need to know the anatomy of bees and the peculiarities of insect physiology. Knowledge of the anatomy and physiology of bees helps the student of

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the Faculty of Veterinary Medicine to understand the features of the biorhythms of the bee colony and correctly organize preventive measures for the elimination of diseases of bees with sufficient economic efficiency.

**Cell technology in veterinary medicine.** Selective scientific and educational discipline "Cell technology in veterinary medicine" provides in-depth study of biological characteristics of stem cells (SC), methods of their obtaining, identification, cultivation, storage and application in order to restore the structure and function of pathologically altered tissues of an animal organism, considers the features of directed differentiation SC, mechanisms of compatibility of cells with the organism of the recipient animal, a complex of issues related to the use of SC in the veterinary cell regenerative therapy

**Dermatology of horses.** Discipline studying skin diseases in horses that can be primary, that is the origin of dermatological and secondary caused by disorders of other organs. It makes dermatological diseases in horses most difficult to diagnose.

**Veterinary nephrology and urology.** Physiology of urine production. Diseases of urinary tract in domestic animals, etiology, pathogenesis, symptoms, diagnostic approach (urinalysis, ultrasound examination, plain and contrast X-ray, CT- and MRI-imaging), management of these disease and prevention.

**Fundamentals of the veterinary pharmacy.** The discipline studies the historical aspects of the formation and development of medicine and pharmacy, the trends of the veterinary pharmaceutical industry in the world and in Ukraine; the organization of veterinary pharmacies and implementing rules for veterinary medicines and goods for veterinary purposes; the structure and functions of veterinary pharmacies, general requirements for the manufacture and storage of veterinary medicines and their quality control.

**Veterinary X-ray and diagnostics.** The course examines the theory and practice of using X-rays for determination of norm and pathology, definition of animals' health and early diagnosis of diseases.

**Veterinary haematology.** The course is aimed at better understanding of blood in different animal species. The study of this discipline is an integral early diagnosis, treatment and prevention of diseases of various body systems.

**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.

**Veterinary endocrinology.** The course studies the development, structure and function of animal endocrine glands (pituitary gland, thyroid gland, adrenal gland, endocrine department of the pancreas, gonads, etc.), operation and exchange of hormones in the body, laboratory tests and disease associated with dysfunction these glands.

**Dentistry of dogs and cats.** This discipline studies physiology, pathology, prophylaxis and treatment of diseases of the oral cavity, jaws and surrounding areas of the skull. This is the science of diagnosing, preventing and treating congenital anomalies and acquired defects, damages and deformations of the organs of the tooth-jaw system. It is divided into three major sections: therapeutic, surgical and orthopedic stomatology. The discipline is closely connected with therapy, ophthalmology, neurology. At this stage, veterinary dentistry is rapidly developing, using the achievements of scientific and technological progress, and therefore requires constant training and improvement of specialists in this field.

**Ultrasound diagnosis and endoscopy.** Ultrasound and endoscopy is a modern, non-invasive and informative method of diagnostics of diseases in animals. The development of diagnostic methods is a priority in veterinary medicine.

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**Veterinary Oncology.** The mechanisms of carcinogenesis, regularity of biological processes which take place during the tumor cell growth at the molecular level, biological and cytomorphological properties of tumor cells in vitro, and the classification of tumors are studied. The questions concerning the method of pick up of pathological tumor material, preparation of this material for cytological examination and differential diagnosis of tumors, are considered.

**Clinical pharmacology.** The science studies the use of medicines for the diseases of certain organs and systems in view of etiologic factors of disease pathogenesis, the clinical signs, the indications and the contraindications, the species, age and individual animals to achieve the maximum therapeutic effect.

**Veterinary business organization.** Veterinary entrepreneurship – is an initiative, independent veterinary activity, related to risk, directed on systematically profit, income or other benefits from the sale of goods for veterinary use or providing of veterinary services to persons, registered as veterinary business organizations.

**Clinical neurology and animals behavior correction.** The course examines the features of diagnosis and treatment of animals with disorders of the nervous system, modern instrumental and laboratory diagnostic techniques, tools and treatment schemes and providing of professional care for patients with disorders of behavior at diseases of the nervous system.

**Intensive care and resuscitation of animals.** The course examines the issues of emergency help and intensive treatment of animals, the diagnostic of terminal conditions, methods of providing professional assistance, therapeutic techniques and drugs which are used in intensive therapy and the peculiarities of application of liquid and diet therapy for animals in critical states.

*Optional subjects by specialty (block 2)*

*Optional block 2.1 "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.

*Optional block 2.2 "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.

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**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 2.3 "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 2.4 "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 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

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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.

#### *Optional block 2.5 "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 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 2.6 "Scientific-fundamental and applied problems  
of veterinary medicine"*

**Physiology of higher nervous activity and zoopsychology.** Discipline provides an in-depth study on the functioning of the cerebral hemispheres and subcortical masses basic cortical processes, congenital and acquired forms of individual, integrative brain activity, research methodology of higher nervous activity, methods of testing conditioned reflex activity in animals of different species, and mechanism of localization called temporary bonds, inhibition of conditioned reflexes, neural mechanisms of information processing in sensory systems, analytical and synthetic brain activity, genetics and typology of higher nervous activity, types and properties instincts categories of perception analyzers.

**Molecular biology of the cell.** Discipline provides training for master-researcher who has knowledge of the evolution and ontogeny of cells, its molecular organization; role of subcellular structures and structural mechanisms of regulation of cell activity in intact mammal organism.

**Theory and practice of using stem cells in veterinary medicine.** Discipline is examining the biological characteristics of stem cells (SC), methods of their production, identification, cultivation, storage and application of SC to restore damaged structure abnormal tissue of animals; features directed differentiation SC compatibility mechanisms of cell body animal-recipient.

**Oncology and transplantology in veterinary medicine.** Discipline studies basic patterns of occurrence and development of tumor; main provisions of Experimental Oncology; strategy for the treatment of cancer of animals; basic rules of transplantation of tissues and cells; requirements for graft and recipient animals.

**Methods of scientific and morphological studies.** Discipline studies and analyzes various macro-, micro- and ultramicroscopic methods and techniques of research

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body structure of domestic animals and poultry. It has a shape research and scientific approach to the selection of complex methods and techniques of research of various materials of animal origin depending on the goal and expectations of future veterinarians and scientists training lays the foundation of a scientific specialty - pathology, oncology, animal morphology.

*Optional subjects by Student's Choice*

**Nutrition and maintenance of small pets.** Nutrition is a science that studies the rules of feeding. The study of this discipline provides mastering the basics of rational nutrition of animals, depending on their physiological features, age and physiologic condition. Neglecting of the basic rules of rational nutrition, excessive physical activity, or vice versa, decreasing in the motor activity of animals lead to various diseases. The main task of dietary nutrition is to select an effective, balanced diet, which will improve the general condition of the animal during intense stress, and will help to prevent diseases of the digestive and other body's systems. Also considered are the basics of canine, feline, ornithology, modern methods of keeping, grooming, feeding, drinking, breeding and use of dogs, cats, birds, rodents, reptiles kept at home, issues of humane treatment of pets, basics of ethology and dog training , skin care and its derivative animal health control.

**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.

**Training of masters of sciences  
branch of knowledge "Veterinary medicine"  
in specialty 212 "VETERINARY HYGIENE, SANITARY AND EXPERTISE"  
in educational-professional 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 | 1,5 years                     |
| Credits ECTS                                      |                               |
| – educational and professional programs           | 90                            |
| Language of teaching                              | Ukrainian                     |
| Qualification                                     | Doctor of Veterinary Sanitary |

**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.

**Educational-professional programs of master's training**

***Optional Block "Food Safety and Quality"***

Program provides training professionals capable of planning and organization of the long-term and annual plans for inspections, assessment the performance through planning measures to address identified deficiencies. Apply monitoring procedures and understand their importance in ensuring the safety and quality of particular food and feed. Master the principles and procedures of legal control, risk-based approach, including the characteristics and structure of risk analysis, methods of risk assessment and 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

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(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.

### **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).

### **Proposed Topics for Master Theses**

1. Sanitary measures and specific quality characteristics of milk supplied to dairy plants.
2. Monitoring of Salmonella genus bacteria in poultry meat and feed.
3. Terms of use and risk management of meat hygiene at the meat-processing enterprise.
4. Basic principles of state control planning (by the example of State Service of Ukraine on Food Safety and Consumers Protection territorial bodies).
5. Analysis of safe cheese production of good quality.
6. Criteria for safety and quality of eggs.
7. Sanitary and hygienic assessment of farming conditions (pigs, cattle, poultry, laboratory, wild, decorative animals, the example of farms of different ownership)
8. Evaluating the effectiveness of disinfectants at the facilities (example of different farms, processing facilities).
9. Efficacy of mineral premixes based on chelate compounds of trace elements (for poultry, pigs, cattle)
10. Sanitary and hygienic assessment of products based on silver nanocompounds on animal development (poultry, pigs, cattle).
11. Biologically active substances biotechnological synthesis and their hygienic assessment.

**Curriculum of Master training  
in educational program "Veterinary hygiene, sanitary and expertise"  
(educational and professional program of Master's training)**

| Code<br>n/a                                       | Components of the educational-professional program<br>(educational disciplines, course projects (paper), practice,<br>qualification work) | Amount of<br>credits | The final<br>control  |
|---|---|----------------------|-----------------------|
| <b>1. 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<br>of intellectual property   | 4                    | test                  |
| <b>Optional components of EPP</b>                 |   |                      |                       |
| <i>Optional subjects by Student's Choice</i>      |   |                      |                       |
| OB 1  | Optional subject 1  | 3                    | test                  |
| OB 2  | Optional subject 2  | 3                    | test                  |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>   |   |                      |                       |
| <b>Compulsory components of EPP</b>               |   |                      |                       |
| CC 4.   | Hygiene of milk and dairy products  | 7                    | exam                  |
| CC 5.   | Hygiene of primary processing of animals and products of<br>slaughter   | 7                    | exam                  |
| CC 6.   | Water Hygiene and Supply  | 8                    | exam                  |
| CC 7.   | Hygiene of vegetable foods  | 7                    | test                  |
| CC 8.   | Hygiene of feed and feed additives  | 7                    | test                  |
| <b>Optional components of EPP</b>                 |   |                      |                       |
| <i>Optional Block by specialty</i>                |   |                      |                       |
| <i>Optional Block 1 "Food Safety and Quality"</i> |   |                      |                       |
| OB 1.1  | Analysis of microbiological risks of food and feed  | 3                    | exam                  |
| OB 1.2  | State Control of Foodstuffs   | 10                   | exam                  |
| OB 1.3  | Methods of veterinary and sanitary examination  | 7                    | exam                  |
| <b>The total amount of compulsory components</b>  |   | <b>49</b>            |                       |
| <b>The total amount of optional components</b>    |   | <b>26</b>            |                       |
| <b>3. OTHER TYPES OF TRAINING</b>                 |   |                      |                       |
| CC 9  | Production practice   | 10                   | test                  |
| CC 10   | Preparation and defense of master's work  | 5                    | Protection of<br>work |
| <b>THE TOTAL AMOUNT OF EPP</b>                    |   | <b>90</b>            |                       |

**Annotations of disciplines in the curriculum**

**1. 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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Hygiene of milk and dairy products.** Discipline examines the hygiene requirements for \_ herd of mammary animals, keeping of animals, premises, stalls, equipment, animal identification and herds, hygiene during the milking, reception and transportation of milk, people who participate in the production of raw milk, supply. Highlights question of veterinary inspection of dairy farms, milk collecting stations and other facilities that carry out in primary production of milk. Discipline involves familiarization with international legislation and the main legal documents of Ukraine for security of dairy products. Examines hygiene of processes in production of dairy products in terms of the use of modern technology. Also planned study of the basic indicators of quality and safety of dairy products, cheese, butter, canned milk, ice cream and methods for their control.

**Hygiene of primary processing of animals and products of slaughter.** The course studies the veterinary and sanitary requirements for primary processing of animals and slaughter products at all stages from growing animals to obtain raw meat. The course studies the sanitary requirements to technological processes: slaughter, primary processing of carcasses of different species of animals and birds; technological processing of hides, intestinal raw materials, by-products, endocrine-enzyme raw materials, food animal fats.

**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.

**Hygiene of vegetable foods.** Highlights issues of hygienic assessment of products of plant origin, ensuring their quality and safety, the possibility of preventing of the potential dangers associated with the production, processing, storage, transportation, sale and consumption of these products, analysis and mastery of modern methods of determining safety and quality.

**Hygiene of feed and feed additives.** The course envisages an in-depth study of legal, organizational and methodological foundations of the system of state regulation of safety and quality of feed, feed additives and premixes for food security at the national and international levels, and practical skills in the organization of monitoring all feed products for feeding productive and unproductive animals taking into account the entire production chain.

### Optional components of EPP

#### *Optional Block by specialty*

#### *Optional Block 1 "Food Safety and Quality"*

**Analysis of microbiological risks of food and feed.** 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.



**State Control of Foodstuffs.** 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 state control of food and other objects of sanitary measures.

**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.

**Training of masters of sciences  
branch of knowledge "Veterinary medicine"  
in specialty 212 "VETERINARY HYGIENE, SANITARY AND EXPERTISE"  
in educational-professional 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 Sanitary |

**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.

**Educational-professional programs of master's training**

***Optional Block "State control of objects of sanitary measures"***

Program provides training professionals capable of planning and organization of the long-term and annual plans for inspections, assessment the performance through planning measures to address identified deficiencies. Apply monitoring procedures and understand their importance in ensuring the safety and quality of particular food and feed. Master the principles and procedures of legal control, risk-based approach, including the characteristics and structure of risk analysis, methods of risk assessment and management.

***Optional Block "Animal health and welfare"***

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.

**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.

### **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 ( "Velykosnytsinske 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).

### **Proposed Topics for Master Theses**

1. Sanitary measures and specific quality characteristics of milk supplied to dairy plants.
2. Monitoring of Salmonella genus bacteria in poultry meat and feed.
3. Terms of use and risk management of meat hygiene at the meat-processing enterprise.
4. Basic principles of state control planning (by the example of State Service of Ukraine on Food Safety and Consumers Protection territorial bodies).
5. Analysis of safe cheese production of good quality.
6. Criteria for safety and quality of eggs.
7. Sanitary and hygienic assessment of farming conditions (pigs, cattle, poultry, laboratory, wild, decorative animals, the example of farms of different ownership)
8. Evaluating the effectiveness of disinfectants at the facilities (example of different farms, processing facilities).
9. Efficacy of mineral premixes based on chelate compounds of trace elements (for poultry, pigs, cattle)
10. Sanitary and hygienic assessment of products based on silver nanocompounds on animal development (poultry, pigs, cattle).
11. Biologically active substances biotechnological synthesis and their hygienic assessment.

**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<br>(educational disciplines, course projects (paper), practice,<br>qualification work) | Amount of<br>credits | The final<br>control |
|--|---|----------------------|----------------------|
| <b>1. 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   | 3                    | offset               |
| <b>Total</b>   |   | <b>19</b>            |                      |
| <b>Compulsory components EPP by decision of the Academic Council of the University</b> |   |                      |                      |
| CCU 1.   | History of Ukrainian nationhood   | 4                    | test                 |
| CCU 2.   | Etnoculturology   | 4                    | exam                 |
| CCU 3.   | Ukrainian Language for Professional Purposes  | 4                    | exam                 |
| CCU 4.   | Philosophy  | 4                    | test                 |
| CCU 5.   | Foreign Language  | 5                    | exam                 |
| CCU 6.   | Physical Education  |                      | test                 |
| CCU 7.   | Agricultural policy   | 4                    | test                 |
| CCU 8.   | Basics of Life Safety   | 3                    | test                 |
| CCU 9.   | Methodology and organization of scientific research on the basics<br>of intellectual property   | 4                    | test                 |
| CCU 10.  | Business Foreign Language   | 4                    | test                 |
| CCU 11.  | Personal legal culture  | 3                    | test                 |
| <b>Total</b>   |   | <b>39</b>            |                      |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |   |                      |                      |
| <b>Compulsory components EPP</b>   |   |                      |                      |
| CC 6.  | Veterinary Deontology and ecological Sanitation   | 7                    | test                 |
| CC 7.  | Animal Genetics and Breeding  | 4                    | test                 |
| CC 8.  | Anatomy of animals  | 8                    | exam                 |
| CC 9.  | Cytology, Histology, Embryology   | 8                    | exam                 |
| CC 10.   | Ecotrophology   | 4                    | test                 |
| CC 11.   | Biochemistry of Animals with the Fundamentals of Physical and<br>Colloidal Chemistry  | 6                    | exam                 |
| CC 12.   | Animal Physiology   | 6                    | exam                 |
| CC 13.   | Animal Nutrition  | 4                    | test                 |
| CC 14.   | Veterinary Immunology   | 3                    | test                 |
| CC 15.   | Veterinary and Sanitary Microbiology  | 4                    | exam                 |
| CC 16.   | Veterinary and Sanitary Virology  | 5                    | exam                 |
| CC 17.   | Animal Hygiene  | 7                    | exam                 |
| CC 18.   | Veterinary Sanitary   | 5                    | exam                 |
| CC 19.   | Pathological Physiology   | 6                    | exam                 |
| CC 20.   | Animal Ethology and Welfare   | 6                    | exam                 |
| CC 21.   | Veterinary Clinical Diagnostic  | 6                    | exam                 |
| CC 22.   | Veterinary Pharmacology   | 4                    | test                 |
| CC 23.   | Pathological Morphology   | 8                    | exam                 |
| CC 24.   | Parasitology and Invasive Diseases  | 6                    | exam                 |
| CC 25.   | Veterinary Radiology  | 4                    | test                 |
| CC 26.   | Food Safety and Quality   | 8                    | exam                 |
| CC 27.   | Veterinary Obstetrics, Gynecology and Andrology   | 6                    | exam                 |
| CC 28.   | Veterinary Toxicology   | 4                    | test                 |
| CC 29.   | General and Special Surgery   | 8                    | exam                 |
| CC 30.   | Food Hygiene  | 11                   | exam                 |
| CC 31.   | Animal Internal Diseases  | 8                    | exam                 |

**MASTER CURRICULA AND TRAINING PROGRAMS**

| <b>Code n/a</b>  | <b>Components of the educational-professional program<br/>(educational disciplines, course projects (paper), practice,<br/>qualification work)</b> | <b>Amount of<br/>credits</b> | <b>The final<br/>control</b> |
|--|--|------------------------------|------------------------------|
| <b>CC 32.</b>  | Epizootology and Infectious Diseases   | 8                            | exam                         |
| <b>CC 33.</b>  | Veterinary and Sanitary Inspection   | 6                            | test                         |
| <b>CC 34.</b>  | Commodity Science and Standardization  | 5                            | exam                         |
| <b>CC 35.</b>  | Methods of Sanitary Investigation  | 5                            | test                         |
| <b>CC 36.</b>  | Veterinary policy  | 3                            | exam                         |
| <b>Total</b>   |  | <b>167</b>                   |                              |
| <b>The total amount of compulsory component</b>        |  | <b>225</b>                   |                              |
| <b>Optional components EPP</b>                         |  |                              |                              |
| <i>Optional subjects by specialty (block 1)</i>        |  |                              |                              |
| OB 1.1   | Hygiene of Animal's Transport  | 4                            | test                         |
| OB 1.2   | Food Laboratory Analysis   | 4                            | test                         |
| OB 1.3   | Feed Nutricevtics  | 4                            | test                         |
| OB 1.4   | Biosafety and Biosecurity  | 4                            | test                         |
| OB 1.5   | Food Safety  | 4                            | test                         |
| OB 1.6   | Water Hygiene and Supply   | 4                            | test                         |
| OB 1.7   | Veterinary and Sanitary Forensic   | 4                            | test                         |
| OB 1.8   | Hygiene of Processing Enterprises  | 4                            | test                         |
| OB 1.9   | Animal By-Products Sanitary  | 4                            | test                         |
| OB 1.10  | Game Hygiene   | 4                            | test                         |
| OB 1.11  | Official Audit   | 4                            | test                         |
| OB 1.12  | Hygiene of the Facilities Design   | 4                            | test                         |
| <b>Total</b>   |  | <b>34</b>                    |                              |
| <i>Optional subjects by specialty (block 2)</i>        |  |                              |                              |
| <i>"State control of objects of sanitary measures"</i> |  |                              |                              |
| OB 2.1   | State Control of Foodstuffs  | 14                           | exam                         |
| OB 2.2   | Food Monitoring  | 12                           | exam                         |
| OB 2.3   | Food Risk Analysis   | 12                           | exam                         |
| OB 2.4   | Animal Performance Management  | 12                           | exam                         |
| <b>Total</b>   |  | <b>50</b>                    |                              |
| <i>Optional subjects by specialty (block 3)</i>        |  |                              |                              |
| <i>"Animal health and welfare"</i>                     |  |                              |                              |
| OB 3.1   | Animal Performance Management  | 12                           | exam                         |
| OB 3.2   | International Standards of Animal Maintenance and Exploitation   | 12                           | exam                         |
| OB 3.3   | BAS Technology   | 12                           | exam                         |
| OB 3.4   | State Control of Foodstuffs  | 14                           | exam                         |
| <b>Total</b>   |  | <b>50</b>                    |                              |
| <i>Optional subjects by Student's Choice</i>           |  |                              |                              |
| OB 1   | Bioethics, biosafety   | 3                            | test                         |
| OB 2   | Nutrition and maintenance of small pets  | 3                            | test                         |
| <b>Total</b>   |  | <b>6</b>                     |                              |
| <b>The total amount of optional components</b>         |  | <b>90</b>                    |                              |
| <b>3. OTHER TYPES OF TRAINING</b>                      |  |                              |                              |
| CC 36.   | Educational practice   | 19                           | test                         |
| CC 37.   | Practical training   | 14                           | test                         |
| CC 38.   | Term papers  | 0                            | test                         |
| CC 39  | Preparation and defense of master's work   | 9                            | Protection of<br>works       |
| <b>THE TOTAL AMOUNT OF EPP</b>                         |  | <b>360</b>                   |                              |

**Annotation of disciplines in the curriculum****1. 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.

**Compulsory components EPP by decision of the Academic Council  
of the University**

**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.

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.

## 2. 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

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and the exterior, interior, methods of breeding, selection, assess the quality sires offspring, the impact of selection on the livelihoods and health, the effects of inbreeding and heterosis.

**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

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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 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;

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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 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.

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### Optional components EPP

#### *Optional subjects by specialty (block 1)*

**Hygiene of Animal's Transport.** Peculiarities of small and large animals transporting by rail, road, water and air transport, types of documents depending on the purpose of animals use, customs requirements, hygiene requirements to the equipment of vehicles, their preparation and use.

**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.

**Feed Nutricevtics.** Types, methods of production, storage and purpose of application nutricevtics 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.

**Biosafety and Biosecurity.** 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.

**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.

**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.

**Veterinary and Sanitary Forensic.** 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 Processing Enterprises.** Types and sanitary-hygienic characteristics of processing plants, exploitation peculiarities, hygienic requirements for equipment, water supply, waste disposal.

**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.

**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.

**Official Audit.** HACCP principles, stages of constructing a system safety ensurance; 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.

**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.



*Optional subjects by specialty (block 2)*

*"State control of objects of sanitary measures"*

**State Control of Foodstuffs.** 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 state control of food and other objects of sanitary measures.

**Food Monitoring.** Key factors and principles of ensuring safety and quality of food. Principles and criteria for quality and safety monitoring of food and feed according to the

**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.

**Animal Performance Management.** Effect of exogenous and endogenous factors, including biologically active substances and growth factors on the mechanisms of proteins, fats, carbohydrates, amino acids, macro and micronutrients hydrolysis and transport in the gastrointestinal tract, way of converting feed nutrients in the components of milk meat, eggs, wool; control methods and ways to improve animal productivity; the basic principles of the technology of production of milk, beef, pork, lamb, wool, eggs, poultry meat and other products; ways to improve the production of basic livestock products depending on the conditions of breeding, feeding and maintenance.

*Optional subjects by specialty (block 3)*

*"Animal health and welfare"*

**Animal Performance Management.** Effect of exogenous and endogenous factors, including biologically active substances and growth factors on the mechanisms of proteins, fats, carbohydrates, amino acids, macro and micronutrients hydrolysis and transport in the gastrointestinal tract, way of converting feed nutrients in the components of milk meat, eggs, wool; control methods and ways to improve animal productivity; the basic principles of the technology of production of milk, beef, pork, lamb, wool, eggs, poultry meat and other products; ways to improve the production of basic livestock products depending on the conditions of breeding, feeding and maintenance.

**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.

**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.

**State Control of Foodstuffs.** 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 state control of food and other objects of sanitary measures.

*Optional subjects by Student's Choice*

**Bioethics, biosafety.** Bioethics and Biosafety of work with infectious agents. Safety. Types of boxes. Requirements for air filters. Quality control of sterile working conditions. Control of the quality of disinfection of premises, tools, laboratory utensils, laboratory animals after bioprocessing. Requirements for dishes, types of solutions, nutrient medium bacterial, nutrient medium special, peculiarities of preparation, storage and application. Determination of the quality of nutrients in accordance with international standards. Peculiarities of the selection of pathological material for bacteriological, mycological and virological research. Requirements for transportation of selected

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pathological material depending on the group of pathogen hazard. Primary preparation of pathological material. Environments for primary allocation of pathogens.

**Nutrition and maintenance of small pets.** Nutrition is a science that studies the rules of feeding. The study of this discipline provides mastering the basics of rational nutrition of animals, depending on their physiological features, age and physiologic condition. Neglecting of the basic rules of rational nutrition, excessive physical activity, or vice versa, decreasing in the motor activity of animals lead to various diseases. The main task of dietary nutrition is to select an effective, balanced diet, which will improve the general condition of the animal during intense stress, and will help to prevent diseases of the digestive and other body's systems. Also considered are the basics of canine, felinology, ornithology, modern methods of keeping, grooming, feeding, drinking, breeding and use of dogs, cats, birds, rodents, reptiles kept at home, issues of humane treatment of pets, basics of ethology and dog training , skin care and its derivative animal health control.

**FACULTY OF ALIMENTARY TECHNOLOGIES AND MANAGING  
OF QUALITY OF PRODUCTES OF AGRICULTURAL COMPLEX**

**Dean** – doctor of technical sciences, professor Bal'-Prylypko Larissa Vatslavivna

Phone: (044) 527-89-50

E-mail: bold@mail.ru

Location: training housing № 12, rooms 305 and 306

Faculty organizes and controls educational process of preparation for the Masters educational program to the specialties:

**Specialty 152 "Metrology and Information and measuring technique"**

***Educational program "Quality, standardization and certification"***

Guarantor of the educational and professional program - Candidate of Technical Sciences, Associate Professor Sliva Yuliya

Department in charge of graduate training:

**Chair of standardization and certification of agricultural production**

Tel: (044) 527-82-78

E-mail: standardization@ukr.net

Chief of the chair – doctor of technical sciences, professor Sykhenko Vladyslav

**Specialty 181 "Alimentary technologies"**

***Educational program "Technologies of storage, preserving and reprocessing of meat"***

Guarantor of the educational and professional program - Doctor of Technical Sciences, Professor Palamarchuk Igor

Department in charge of graduate training:

**Chair of technologies of meat, fish and seafood**

Tel: (044) 527- 88-85

E-mail: slob2210@ukr.net

Chief of the chair – candidate of engineering sciences, associate professor Savchenko Alexander

***Educational program "Technologies of storage and reprocessing of aquatic bioresources"***

Guarantor of the educational and professional program - Doctor of Biological Sciences, Professor Derevyanko Lyudmila

Department in charge of graduate training:

**Chair of technologies of meat, fish and seafood**

Tel: (044) 527- 88-85

E-mail: slob2210@ukr.net

Chief of the chair – candidate of engineering sciences, associate professor Savchenko Alexander

***Educational program "Nutritionology"***

Guarantor of the educational and research program - Doctor of Technical Sciences,  
Professor Sukhenko Vladislav

Department in charge of graduate training:

**Chair of technologies of meat, fish and seafood**

Tel: (044) 527- 88-85

E-mail: slob2210@ukr.net

Chief of the chair – candidate of engineering sciences, associate professor  
Savchenko Alexander

**Training of masters of sciences  
of sphere of knowledge of "Automation and fabrication of instruments"  
specialty 152 "METROLOGY AND INFORMATION AND MEASURING TECHNIQUE"  
by educational program "QUALITY, STANDARDIZATION AND CERTIFICATION"**

|  |   |
|--|---|
| Form of Training:                              | Licensed number of persons:                                 |
| – daytime                                      | 50  |
| – extramural                                   | 50  |
| Term of training:                              |   |
| – daytime educational and professional program | 1,5 years   |
| – extramural                                   | 1,5 years   |
| Credits ESTS:                                  |   |
| – educational and professional program         | 90  |
| Language of training                           | Ukrainian, English  |
| Qualification of graduates                     | Specialist by quality,<br>standardization and certification |

### Concept of training

The character peculiarity of process of training of specialists by quality, standardization and certification is those that this program may study graduates of various directions of education. It is open for bachelors of any educational program, has the multivectorial and multivariant character. At the same time there exist the numerous differences in the lists of disciplines studied by choose of bachelors who has the economic degree, and by bachelors who finished training in spheres of technology, engineering and biology.

The principal goal set forth in training by this specialty is obtaining by students of knowledge on principal constituents of the system of technical regulation: basic legal deeds of Ukraine in sphere of technical regulation; principal tasks, principles, scientific and practical approaches used in spheres of standardization, certification, metrology and quality; influence of system of technical regulation on effectiveness of functioning of economy; fundamental normative documents used in spheres of standardization, certification, metrology and quality management; international and European normative base and practice of operation in these spheres.

### Spheres of employment of graduates

The diploma of master of sciences by educational program of "Quality, standardization and certification" gives graduates to take the wide number of positions: specialist by quality, engineer by quality, official of department of quality management, its validation, technical control, employee of metrological services, specialist by standardization and certification, auditor and so on. such level of education is necessary for specialists who work in sphere of standardization of new types of production, certification of products and services, drawing up and directing of technical documentation, carrying out of inner audits and self-inspections, validation of technological processes, attestation of personnel, equipment and premises etc.

### Practical training

The practical training of students who would graduate with the degree of Master of sciences" by educational program of "Quality, standardization and certification" is carried out by two stages – the acquainting practice accomplished just after their enrolment, and the fore-diploma one. Being in practical training, students obtain the basic knowledge on their practical activities in future, obtain the practical skill and professional knowledge

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necessary for future specialist in standardization, certification and quality management. Said practices has the character of training and obtaining of practical skill and differ by their purposes, content and terms of training

The dominant bases of practices are: State enterprise Ukrainian scientific and research institute of problems of standardization, certification and quality"; VAT "MZVKK" separated department of "Myronivskii miasopererobnyi zavod "LEGKO"; "Ukrains'ka asociatsiia yakosti"; Bureau "Veritas"; TOV "TYuF rheinland Ukraina"; Ukrainian R&D institute of agricultural radiology; Leonid Pogorelov Ukrainian R&D institute of forecasting and testing of technique and technologies of agricultural manufacturing; State center of certification and expertise of agricultural products, city of Kyiv; PAT "Zhashkivskii masolzavod" Cherkasy region; DP "Malyn's'ke lisove gospodarstvo" Zhitomir region.; STOV "Staryns'ka ptakhofabryka"; VP NULES of Ukraine "O. Muzychenko Velykosnityns'ke NDG", Kyiv region.; Bila Tserkva' milk-processing plant, Kyiv region; TOV "Galakton" Kyiv region; bakery industrial complex №10, city of Kyiv; TOV "Oboon", city of Kyiv; TOV "Rosynka", city of Kyiv; VAT "Farmak", city of Kyiv; TOV "Zavod shampans'kykh vin", city of Kyiv; TOV "Olkom", city of Kyiv; ZAT "Koziatyn's'kii miasokombinat", Vinnitsa region; TOV "Gaisyn's'kii viasokombinat" Vinnitsa region and others.

### **Proposed Topics for Master Theses**

1. Development of the program of interlaboratory testing of soils on their conformity to norms of ISO/IEC Guide 43-1:1997 at PRAT "Myronivskii khiboprodukt".
2. Development of the program of management of aspects of manufacturing at the reprocessing enterprise of VAT "Farmak".
3. Introduction of system of statistical control of processes realized in the laboratory of testing of agricultural technique.
4. Studying of demands of consumers to quality of wood used in producing of furniture.
5. Development of proposals on optimization of system of monitoring of processes of producing of condensed milk at PAT "Bershad'-moloko".
6. Development of standard on technology of planting of gladiolus and substantiation of standardized indices of their quality at DP "UkrNDNTs".
7. Development of model of calculation of optimal ration of fattening of heavy beasts.
8. Development of standard on technology of breeding of ostrich and substantiation off its standardized indices of quality.
9. Development of elements of system of control of safety and quality of berries planted at private farms.
10. Appraisal of requirements of the EU countries to procedures of validation of testing of foodstuffs and development of recommendations on their introduction in practice of operation of Ukrainian laboratory of quality and safety of products of agricultural complex.

**Curriculum of Master training  
in educational program "Quality, Standardization and Certification"  
(educational and professional program of master's training)**

| Code n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits | The final<br>control |
|---|---|----------------------|----------------------|
| 1. GENERAL TRAINING CYCLE   |   |                      |                      |
| Compulsory components of EPP  |   |                      |                      |
| CC 1  | Legal support of management decisions   | 4                    | examination          |
| CC 2  | Businesslike foreign language   | 3                    | examination          |
| CC 3  | Psychology of management  | 3                    | examination          |
| CC 4  | Agricultural policy   |                      | examination          |
| Optional components of EPP  |   |                      |                      |
| Optional subjects by Student's Choice   |   |                      |                      |
| OB 1  | Selective discipline 1  | 3                    | examination          |
| OB 2  | Selective discipline 1  | 3                    | examination          |
| 2. SPECIAL (PROFESSIONAL) CYCLE OF TRAINING                                     |   |                      |                      |
| Compulsory components of EPP  |   |                      |                      |
| CC 5  | Legal metrology and standardization   | 5                    | examination          |
| CC 6  | Quality management  | 7                    | examination, CP      |
| CC 7  | Quality and safety management and food products   | 7                    | examination          |
| CC 8  | Information technology and mathematical modeling of<br>quality management systems   | 5                    | examination          |
| CC 9  | Standardization and certification of products of agriculture  | 5                    | examination, CP      |
| CC 10   | Systemic approach and methods of taking of decisions  | 4                    | examination          |
| CC 11   | Research and innovative processes   | 4                    | examination          |
| CC 12   | Audit and certification   | 3                    | examination          |
| CC 13   | Economical aspects of entrepreneurship  | 3                    |                      |
| Optional components of EPP  |   |                      |                      |
| Optional Block by speciality  |   |                      |                      |
| Optional Block 1 "Food quality and safety management"                           |   |                      |                      |
| OB 1.1  | Management of personnel   | 4                    | examination          |
| OB 1.2  | International and regional standardization and certification  | 4                    | examination          |
| OB 1.3  | Methods of ensuring and managing by quality of foodstuffs   | 4                    | examination, CP      |
| OB 1.4  | Philosophy of science and innovation development  | 4                    | examination          |
| Optional Block 2 "Quality and safety management at agro-industrial enterprises" |   |                      |                      |
| OB 2.1  | Agricultural quality management production and production   | 4                    | examination          |
| OB 2.2  | Management by conditions of environment   | 4                    | examination          |
| OB 2.3  | Standardization and certification of products, manufactures<br>and quality assurance systems  | 4                    | examination, CP      |
| OB 2.4  | Philosophy of science and innovation development  | 4                    | examination          |
| The total amount of compulsory components                                       |   | 56                   |                      |
| The total amount of optional components   |   | 24                   |                      |
| 3. OTHER TYPES OF TRAINING  |   |                      |                      |
| CC 14   | Practical training  | 5                    | examination          |
| CC 15   | Preparation of diploma and protection of the master's<br>degree   | 5                    | examination          |
| THE TOTAL AMOUNT OFF EPP  |   | 90                   |                      |



## Annotation of training disciplines

### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Legal support of management decisions.** The program envisages the study of a complex of modern legal knowledge, skills and competences necessary for professional activity in ensuring the powers of state bodies and providing citizens with public services. To help to understand more deeply the nature and nature of public administration, to study the legislation that regulates the activity of public administration, as well as the practice of its application.

**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.

**Psychology of management.** Theoretical and practical training of students by problems of cognition of conditions, factors, driving forces and determinants of development of personality as the managing person. Specificity of motivation of managers and their adaptive processes in social medium, types of managers and styles of managing.

**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.

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

**Legal metrology and standardization.** Organization standards (enterprises, institutions). Checking the standard for compliance with the achieved level of development of science and technology in the relevant scope of the standard. Determination of the achieved level of development of science and technology in the relevant scope of the standard. The procedure for amending the regulatory documents. Technical regulations. Legislation in the field of standardization. Procedure for cancellation of regulatory documents. Information about changes in regulatory documents. Unification of products and / or services. Standardization of products and / or services. State standardization system. Normocontrol of technical documentation of the organization (enterprise, institution). Ways of providing the organization's services (enterprises, institutions) with the necessary documentation for 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.

**Quality management.** Systems of managing by quality of products and/or services. Structure of organization (enterprise, institution). Standards of system of quality management DSTU ISO of 9000 series. Special functions of systems of management by

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quality of production and/or services. Development, introduction and managing in structure of quality systems. Documentation used in systems of managing by quality of products and/or services. Technological documentation. Plan of carrying out of works by managing by quality of products and/or services. Identification of demands and requirements of consumers of production at stage of its marketing. Evaluation of level of quality of production and/or services. Identification of capability of the organization (enterprise, institution) to reach the set indices of quality of production and/or services. Work in prevention of origination of drawbacks to be done by results of inner audits of system of quality management. Methods of measurement, analysis and optimization used in sphere of quality management. Corrective actions carried put by elimination of unconformities found in process of inner and outer audits of the system of quality management.

**Quality and safety management and food products.** The training program of the discipline presumes studying of requirements of Ukrainian laws and normative documents related to normalization of parameters of quality and safety of products of agriculture and raw materials used in producing of foods; acquainting with values of maximum permissible levels of content of various products of agriculture normalized by national, European and international normative documents; standards of ISO 14000 series related to norms of protection of environment in functioning of enterprises that work in sphere of agriculture. Taking over by practical experience in development by norms of standards of ISO 9000 series and principles of HACCP of systems of managing of quality and safety of forages and agricultural products at all stages of their manufacturing.

**Information technology and mathematical modeling of quality management systems.** The course is a course that allows students to understand the essence of using simulation results to select the parameters of technological processes and possible methods of calculating equipment in the technology industry, and critically approach the choice of organization of food production, technological process of production. The study of this discipline gives future specialists the opportunity of scientific and technical substantiation and control of technological processes in order to produce high quality products, based on the position of system analysis.

**Standardization and certification of products of agriculture.** The training program of the discipline presumes studying of principles of international standardization and national standardization of agricultural production, requirements of principal international, European and national legal and normative documents by standardization and certification of agricultural production, ensuring of its safety and proper quality, acquainting with practice of development of normative documents.

**Systemic approach and methods of tasking of decisions.** The training program of the discipline presumes acquisition by experience in finding of systemic regularities, discriminate the basic stages of work in solving of problems, identify technologies of operation by the system, what is the rational index of reaching of set purposes and use of resources, use the most known methods of taking of decisions. Studying of principles of systemic approach, technologies of typical methods of management in systems, algorithm of method of multicriterial scales.

**Research and innovation processes.** Methods of scientific research. Methods of researching the formation of product quality (services provided). Types and potential of material means (equipment, equipment, resources) to determine the conditions of formation of product quality (services provided). Methods for determining the need for material resources (equipment, equipment, resources) to determine the conditions for forming the quality of products (services provided). Information flows of forming the quality of products (services provided). Collection and processing of information flows. Analysis and systematization of information. Process modeling. Causality in the areas of quality, standardization and certification. Forecasting the development of the production system.

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Analysis of production system development. Analysis of staff motivation. Methods of scientific research. Collection and processing of information flows. Analysis and systematization of information.

**Audit and certification.** Procedures of ordering for certification of products and/or services, and/or quality systems. Objects of certification, schemes of certification. Rules of use of schemes of certification. rules of choose of schemes of certification. schemes of testing of products and/or services, and/or quality systems. Certificates of conformity. Systems of certification and accreditation used in some foreign countries. Self-appraisal and inner audit of quality systems. Outer audit in sphere of quality. Certification of products by procedures of system of UkrSEPRO.

**Economical aspects of entrepreneurship.** The training program of the discipline presumes studying of theoretical concepts and acquiring of practical skill in work in finding of concrete methods of taking of substantiated methods of management, carrying out of economical calculations, accomplishing of analytical and research works by identification of inner resources in economical operation of the enterprise.

### **Optional components of EPP**

#### *Optional Block by speciality*

#### *Optional Block 1 "Food quality and safety management"*

**Management of personnel.** System of calculable characters of qualification of personnel. General principle of social distribution of labor in Ukraine. System of normative documents used in sphere of labor, distribution of labor by its types in the society. Positioning of specialists in social distribution of labor. Corporal culture of the organization (enterprise, institution). Social and economical state of the society and prognosis of tendencies of its progress. Modeling of professional activity (model of the specialist). Modeling of social activity (model of personality). Classification of structural elements of professional activity.

**International and regional standardization and certification.** The training program of the discipline presumes studies of principles of international standardization, accreditation and attestation of conformity, norms of basal international and European legal and normative documents used in spheres of standardization, certification and accreditation and protection of environment in the agricultural branch of public economy, methods of ensuring of quality and safety of foods and activity in this sphere of international and regional organizations by standardization, accreditation and attestation of conformity.

**Methods of ensuring and managing by quality of foodstuffs.** Organization of good hygienic, manufacturing and laboratory practices at enterprises that produce foodstuffs, which conform to established international norms concerned of management of safety and quality of foodstuffs, development and introduction of systems of managing of quality safety of foods based on norms of system of HACCP. Certification of foodstuffs and systems of management used in practice of fabrication of foodstuffs.

**Philosophy of science and innovation 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 postnonclassical ideals of scientism. Methodology of perception of scientific and innovative activity. Study of basic scientific forms. Value of basic and applied research strategies. Philosophical foundations of classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of scientific worldview. Logic of scientific research in the context of contemporary global issues (environmental, technological and social). Axiological dimension of science: the problem of responsibility of the scientist.

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*Optional Block 2 "Quality and safety management at agro-industrial enterprises"*

**Agricultural Quality Management production and production.** The problems of quality management are considered in the context of ensuring the competitiveness of agricultural products and services provided by enterprises. The most important stages of development, current state of the theory and practice of quality management are covered. The economic concepts of quality, principles and methods of its evaluation, organizational and methodological principles of quality assurance and quality management of products and services are investigated. Particular attention is paid to quality management systems based on ISO 9000 series standards, TQM concepts, environmental management systems, and occupational health and safety management.

**Management by conditions of environment.** Procedures of management by conditions of environment by norms of standards of DSTU ISO 14000 series. Documentation by methods of management of environment drawn up by norms of standards of DSTU ISO 14000 series. Methods of quantitative evaluation of environmental and social consequences of occurred accidents and incidents. Extraordinary situations. Documents on rules of prevention harm for natural conditions (material, informative etc.) or identification of level of such harm for men in occurrence of extraordinary situations. Regulations by examination and accounting of accidents, professional diseases and emergencies in organizations, enterprises and institutions. Methods of direct and indirect evaluation of harm inflicted for men and environment. Modeling of schemes of origination of extraordinary situations. Immediate causes of occurrence of accidents. Systems of centralized and local warning of population. Procedures of giving of information related to rules of protection of population and territories. Basic procedures of protection of population and territories in occurrence of extraordinary situations. Means of individual protective devices. Criteria and basic principles of carrying out of evacuative actions. bodies responsible for evacuation, their tasks and functions.

**Standardization and certification of products, manufactures and quality assurance systems.** Mastering the scientific-theoretical foundations, methodological and organizational provisions of standardization and certification of agricultural products, production and quality management.

**Philosophy of science and innovative development.** Philosophical and scientific approaches to the study of science and innovation. Philosophy of science: ontological, epistemological, epistemological dimension. Forms of organization of science. Classical, non-classical and post-non-classical ideals of science. Methodology of cognition of scientific and innovative activity. Study of basic scientific forms. The value of fundamental and applied research strategies. Philosophical principles of classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of the scientific picture of the world. The logic of scientific research in the context of global problems of the present (environmental, technogenic and social). The axiological dimension of science: the problem of scientist responsibility.

**Training of masters of sciences  
of sphere of knowledge of "Manufacturing and related technologies"  
of specialty of 181 "FOOD TECHNOLOGIES"  
by educational program "TECHNOLOGIES OF STORAGE, PRESERVING AND  
REPROCESSING OF MEAT"**

|  |  |
|--|--|
| Form of Training:                              | Licensed number of persons:  |
| – daytime                                      | 30   |
| – extramural                                   | 30   |
| Term of training:                              |  |
| – daytime educational and professional program | 1,5 years  |
| – extramural                                   | 1,5 years  |
| Credits ESTS:                                  |  |
| – educational and professional program         | 90   |
| Language of training                           | Ukrainian, English   |
| Qualification of graduates                     | Masters of sciences (technologies of storage, preservation and reprocessing of meat) |

**Concept of training**

To solve the problem of rising of quality of work in storage, preservation and reprocessing of meat raw materials, it's necessary to expand the net of training and rising of qualification of experts who work in this sphere. Its actuality is stressed by need of the steady rising of effectiveness of introduction of advanced technologies, and the way to realize the task of improvement of quality of operation in this sphere of public economy especially actual for Ukraine is training of engineers-technologists by educational program of "Technology of storage, preserving and reprocessing of meat" who have the qualification of "Master of science".

The factor that induces the problem of training of specialists of this qualification is the continuous rise of needs of consumers in production of high-quality foodstuffs of traditional and novel composition and to satisfy their demands, it's necessary to develop the intensive technologies based on results of advanced research in spheres of biotechnology. Therefore there arises the need of liquidation of deficit of qualified specialists who would be capable to solve the tasks of guaranteeing of satisfying of existing demands of market of meat products not only in solving of problems of their storage, preservation and reprocessing by traditional technologies, but to raise their technical level. This problem is especially actual because the modern tendencies of progress of meat industry seen in Ukraine and abroad require the active introduction of advances in biotechnological industry character by high efficiency and the closed cycle of manufacturing, i.e. the purposeful converting of raw materials of zoic origin in concrete foodstuffs at technological lines character by use of specific technological equipment, systems of control and operation and the only way to ensure the stable operation of such complexes is to train specialists of such profile of professional orientation.

**Spheres of employment of graduates**

The principal purpose of the educational program is training of students by technologies of storage, preservation and reprocessing of meat, who would be capable at meat-processing enterprises and factories of adjoining spheres of economy, organizations and firms specialized in organizational, managing, pedagogical, projecting and R&D works in refinement of existing and development of novel technologies of producing of meat finished and semi-finished products.



### Practical training

The practical training is the integral constituent of process of training of specialists who would be graduated as Masters of sciences by educational program of "Technologies of storage, preserving and reprocessing of meat".

The students obtain in process of practical training the basic information on practice of operation in the profile sphere, necessary skill, and professional knowledge necessary for their work in category of specialists in work in the meat-processing industry.

In period of training in the University future masters of sciences do two practical works. All practices differ among themselves by their purpose, content and terms of holding.

Students practice at the advanced enterprises of meat-processing industry after they would have studied the fundamental engineering, social and economical training disciplines.

Students practice at reprocessing enterprises of all forms of property. The places of practical work are chosen dependently of specialization, technical and technological providing of the enterprise and inquiries for specialists.

The dominant bases of practices are the NULES of Ukraine separated enterprise of "O. Muzychenko Velykosnityns'ke" (slaughtering shop, training R&D laboratory of technology of meat and meat products) "Nemishayevskiy agrotechnical college" (fish-processing shop located in Nemishayevo), TOV "Polis", PP "Marshalok", PP "Drygalo" located in city of Bila Tserkva, Kyiv region; TOV "Globynskiy meat-processing complex, Poltava region, TOV "Cheras'ka food-producing company" Cherkasy region, ZAT "Koziatynskiy meat-processing complex", TOV "Gaisynskiy meat-processing complex", Vinnitsa region, TOV "Chernihivskiy meat-processing complex".

### Proposed Topics for Master Theses

1. Improvement of the technology of chopped semi-finished products in the test shell.
2. The use of vegetable raw materials in the development of preventive products.
3. The use of herbal medicinal raw materials in the technology of cooked sausages.
4. Improvement of the technology of boiled sausages using flour from germinated sea buckthorn seeds.
5. Improvement of the technology of pickled meat semi-finished products using berry concentrates.
6. Improving the technology of chopped semi-finished products using vegetables.
7. Improvement of the technology of pies 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<br>n/a                         | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits | The final<br>control |
|-------------------------------------|---|----------------------|----------------------|
| <b>1. GENERAL TRAINING CYCLE</b>    |   |                      |                      |
| <b>Compulsory components of EPP</b> |   |                      |                      |
| CC 1                                | Protection of labor in the branch-industry  | 4                    | examination          |
| CC 2                                | Business foreign language   | 3                    | examination          |
| CC 3                                | Psychology of management  | 3                    | examination          |
| CC 4                                | Agrarian policy   | 3                    | examination          |
| <b>Optional components of EPP</b>   |   |                      |                      |



| Code n/a   | Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|--|---|-------------------|-------------------|
| <i>Optional subjects by Student's Choice</i>           |   |                   |                   |
| OB 1   | Selective discipline 1  | 4                 | examination       |
| OB 2   | Selective discipline 1  | 4                 | examination       |
| <b>2. SPECIAL (PROFESSIONAL) CYCLE OF TRAINING</b>     |   |                   |                   |
| <b>Compulsory components of EPP</b>                    |   |                   |                   |
| CC 5   | Modern methods of investigation used in the branch-industry   | 5                 | examination       |
| CC 6   | Actual problems of the branch-industry  | 7                 | examination, CP   |
| CC 7   | Technology of preservation and processing of meat   | 7                 | examination, CP   |
| CC 8   | Biologically active substances produced of raw materials of zoic origin   | 5                 | examination, CP   |
| CC 9   | Exploitation of technological equipment   | 5                 | examination       |
| CC 10  | Technologies character by economic spending of resources  | 4                 | examination       |
| CC 11  | Optimization of processes of manufacturing  | 4                 | examination       |
| CC 12  | Food quality and safety management  | 3                 | examination       |
| CC 13  | Production management   | 3                 | examination       |
| <b>Optional components of EPP</b>                      |   |                   |                   |
| <i>Optional Block by speciality</i>                    |   |                   |                   |
| <i>Optional Block 1 "Healthy Nutrition Philosophy"</i> |   |                   |                   |
| OB 1.1   | Microstructural analysis of meat and meat products  | 4                 | examination       |
| OB 1.2   | International and regional standardization and certification  | 4                 | examination       |
| OB 1.3   | Technology of forages for domestic animals  | 4                 | examination       |
| OB 1.4   | Philosophy of science and innovation development  | 4                 | examination       |
| <i>Optional Block 2 "Functional Nutrition"</i>         |   |                   |                   |
| OB 2.1   | Nutrition   | 4                 | examination       |
| OB 2.2   | Global trends in the food industry  | 4                 | examination       |
| OB 2.3   | Modern technologies of food storage and preservation  | 4                 | examination       |
| OB 2.4   | Philosophy of science and innovation development  | 4                 | examination       |
| <b>The total amount of compulsory components</b>       |   | <b>56</b>         |                   |
| <b>The total amount of optional components</b>         |   | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                      |   |                   |                   |
| CC 14  | Practical training  | 5                 | examination       |
| CC 15  | Preparation of diploma and protection of the master's degree  | 5                 | examination       |
| <b>THE TOTAL AMOUNT OFF EPP</b>                        |   | <b>90</b>         |                   |

### Annotations of training disciplines

#### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Protection of labor in the branch-industry.** Methods and means used in protection and strengthening of health, prophylactics of sicknesses and ensuring of capability to work by norms legalized in the branch-industry. Principles of choose of procedures of physical training, putting of them in special complexes and sequence of use by destination. Healthy mode of life. Methods and means of development of important psychophysical characters. Methods of psychophysical training. Rules of work in avoiding of physical overfatigue, stale, overstrengthening and other crisis manifestations. Methods of self-control of state of health, grade of physical development and normality of functioning of systems of organism.

**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.

**Psychology of management.** Learning of theory and practice of conditions and factors, moving forces and determinants of development of individuality as managers, specificity of motivation of the administrative person, adaptive processes in microsocium, types of managers and styles of 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.

## 2. SPECIAL (PROFESSIONAL) CYCLE OF TRAINING

### Compulsory components of EPP

**Modern methods of investigation used in the branch-industry.** The program of training presumes studying of basic principles of methodology of carrying out of investigations in the industry by producing of foods, modern norms of classification of experiments, methods of choose, systematization and analysis of scientific information and results of R&D works, as well as acquainting with rules of drawing up of results of research and protection of rights on intellectual property.

**Actual problems of the branch-industry.** The program of training presumes studying of problems, which arise in operation by norms of modern theory and practice of operation of businesspersons by procedures of actual, economical and environmentally friendly technologies of producing and prolongation of term of safe storage of new types of meat and combined products based on its use.

**Technology of preservation and reprocessing of meat.** The principal task stated in learning of this discipline is the advanced study of technologies of preservation of meat and meat products, obtaining of knowledge on novel methods of preservation and storage of finished products, methods of decreasing of losses of mass and preserving of quality of raw materials and finished products, forming of knowledge and practical skill in perfecting of basic technological processes and scientific trends in choose of technologies of storage and preservation of meat.

**Biologically active substances produced of raw materials of zoic origin.** It's presumed to learn the generalized data on composition and basic properties of biologically active substances of various nature, which are the components of raw materials of zoic origin and use of such substances in producing of preparations used in meat industry. Studying this course, students acquaint with characteristics of endocrine, enzyme and other type raw materials used in production of meat preparations, as well as rules of collecting and norms of their initial treatment, preservation and transporting. The students acquaint also with the fundamental principles of fabrication of biologically active substances of zoic origin.

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**Exploitation of technological equipment.** The program of training presumes studying by students of theoretical and practical problems, which arise in realization of typical processes of exploitation of technological equipment used in meat industry, rules of its repair and assembling.

**Technologies character by economic spending of resources.** The program of training presumes learning of fundamentals of theory, directions of progress and innovative technologies of reprocessing of secondary raw materials and wastes of alimentary and reprocessing enterprises, which operate in the agricultural sector of economy, into the energy resource materials, forages, fertilizers, food additives, construction materials and other goods of mass use, what assists in creation of conditions of the full use of natural resources.

**Optimization of processes of manufacturing.** The training program of this course presumes studying of theoretical and practical problems of optimization of typical situations occurred in the branch-industry. The principal goal to reach is identification of optimum conditions of doing of this work in choosing of suitable criteria of quality of accomplishing of technological process to optimize. the students would obtain in process of training the basic knowledge on methods of optimization of typical stages of producing of foods, choose the most influential of these operations and learn to develop the optimum parameters of technological processes and apparatus to use in their realization.

**Food quality and safety management.** The program provides for the study of the requirements of the Laws of Ukraine and regulations on the quality and safety of agricultural products and food raw materials; study of maximum permissible levels of safety indicators in accordance with national, European and international normative documents for different types of agricultural products. products, DSTU ISO 14000 standards for environmental protection for processing and agricultural enterprises.

Mastering the practical skills of developing quality and safety management systems for feed and agricultural products at all stages of its production according to ISO 9000 DSTU and based on HACCP principles.

**Production management.** The subject of the discipline is the formation of students' competence in the basic principles, basic categories, modern concepts, theoretical provisions and practical methods of managing the basic activity of enterprises and the ability to develop a production strategy, the creation and use of industry production subsystems as a basis for ensuring the mission of the organization.

### **Optional components of EPP**

*Optional Block by speciality*

*Optional Block 1 "Healthy Nutrition Philosophy"*

**Microstructural analysis of meat and meat products.** The constituent components of meat. microstructure of muscular tissue and peculiarities of structure of its forms: skeletal, cordial and non-striated muscles. Constitution of skeletal muscle.

**International and regional standardization and certification.** standardization is the most effective means of rising of effectiveness of manufacture and betterment of quality of production at the modern stage of development of human community and its productive capacities. Certification, in turn, is the important means of rising of demand for the consumables both in Ukraine and abroad. Use of procedures of certification permits to rise the competitiveness of production, stimulate efforts in development of new non-traditional products, especially the agricultural ones, that would have the unique properties and satisfy demands of consumers to quality and reliability of production they bought. Use of practice of certification of quality systems permits also to augment volumes of international barter by goods and services.

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**Technology of forages for domestic animals.** The program of training presumes studying of theoretical and practical problems that arise in development and introduction of modern technologies of producing of forages and fodders. The students would explore the optimum variants of technologies of increasing of volumes of production and betterment of quality of forages produced in concrete natural and economic conditions, as well as to rise the effectiveness of their use.

**Philosophy of science and innovation 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 postnonclassical ideals of scientism. Methodology of perception of scientific and innovative activity. Study of basic scientific forms. Value of basic and applied research strategies. Philosophical foundations of classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of scientific worldview. Logic of scientific research in the context of contemporary global issues (environmental, technological and social). Axiological dimension of science: the problem of responsibility of the scientist.

*Optional Block 2 "Functional Nutrition"*

**Nutrition.** Nutrition, food, nutrients and other components contained in products, their effect and interaction, rates of consumption, absorption, loss and excretion of the body, their impact on various types of metabolism and importance in maintaining health or disease.

**Global trends in the food industry.** Acquisition of knowledge of the basics of industrial food technologies 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 preservation.** The program provides for the study of the main provisions on the current state and prospects for the development of technologies for the storage and preservation of food; characterization of preservation principles: biosis, anabiosis, abiosis; ways of canning; characterization of the main methods and methods of preserving the quality of raw materials and foodstuffs; characterization of modern methods of freezing of raw materials and foodstuffs; frozen semis and culinary products; sterilization, pasteurization of food products.

**Philosophy of science and innovative development.** Philosophical and scientific approaches to the study of science and innovation. Philosophy of science: ontological, epistemological, epistemological dimension. Forms of organization of science. Classical, non-classical and post-non-classical ideals of science. Methodology of cognition of scientific and innovative activity. Study of basic scientific forms. The value of fundamental and applied research strategies. Philosophical principles of classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of the scientific picture of the world. The logic of scientific research in the context of global problems of the present (environmental, technogenic and social). The axiological dimension of science: the problem of scientist responsibility.

**Training of masters of sciences  
of sphere of knowledge of "Manufacturing and related technologies"  
of specialty of 181 "FOOD TECHNOLOGIES"  
by educational program "TECHNOLOGIES OF STORAGE AND REPROCESSING  
OF AQUATIC BIORESOURCES"**

|  |  |
|--|--|
| Form of Training:                              | Licensed number of persons:  |
| – daytime                                      | 30   |
| – extramural                                   | 30   |
| Term of training:                              |  |
| – daytime educational and professional program | 1,5 years  |
| – extramural                                   | 1,5 years  |
| Credits ESTS:                                  |  |
| – educational and professional program         | 90   |
| Language of training                           | Ukrainian, English   |
| Qualification of graduates                     | Masters of sciences (technologies of storage and reprocessing of aquatic bioresources) |

### **Concept of training**

Last time processes of reprocessing of fish and seafood became the topics of steadfast attention of operators of market. It was augmented sufficiently the net of enterprises that produce foods made of fish and seafood and technologists introduce the numerous effective technologies of their production. The following progress in this segment of the branch-industry is possible only on condition of refining of training programs and graduating of skilled specialists-technologists qualified as masters of sciences that are specialized by direction of training of "Technologies of storage and reprocessing of aquatic bioresources".

The competence of specialist who has the degree of "Master of sciences" by educational program of "Technologies of storage and reprocessing of aquatic bioresources" is character by his high professional potential and fundamental knowledge, which permit them to operate effectively both in sphere of modern agricultural manufacture and in the sphere of material production in whole.

### **Spheres of employment of graduates**

The principal purpose of the educational program is training of students by technologies of storage, preservation and reprocessing of fish and seafood, who would be capable at R&D organizations, which develop technologies of reprocessing of fish and seafood, agencies of the Ministry of agricultural policy and foods of Ukraine and the State agency of fish economy of Ukraine, especially in the Southern R&D institute of marine, fish economy and oceanography, fish-processing enterprises and ships.

### **Practical training**

The practical training is the integral constituent of process of training of specialists who would be graduated as Masters of sciences by educational program of "Technologies of storage and preservation of aquatic bioresources".

The students obtain in process of practical training the basic information on practice of operation in the profile sphere, necessary skill, and professional knowledge necessary for their work in category of specialists in work in the fish-processing industry.



In period of training in the University future masters of sciences do two practical works. All practices differ among themselves by their purpose, content and terms of holding.

Students practice at the advanced enterprises of fish-processing industry after they would have studied the fundamental engineering, social and economical training disciplines.

Students practice at reprocessing enterprises of all forms of property. The places of practical work are chosen dependently of specialization, technical and technological providing of the enterprise and inquiries for specialists.

The dominant bases of practices are TOV "Rybna manufaktura" Kyiv region, TOV "Aliaska" Kyiv region, TOV "Rybkoopprodukt" Kyiv region, TOV "Berdianskii rybipererobnyi kombinat" Zaporizhzhia region, VAT "Ochakivskii rybokonservnyi kombinat" Mykolaiv region, ZAT "Chernigivs'ke pidpryemstvo po pererobtsi ta realizatsii rybnykh tovariv "Chernigivryba" Chernigiv region, TOV "Rybni promyslovi tekhnologii" Zhitomir region and other.

### Proposed Topics for Master Theses

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 technology of culinary products based on freshwater fish eggs.
4. Improvement of the technology of salted fishery products packed in modified media.
5. Improvement of the technology of marinated semi-finished fish products.
6. Improvement of technology of fish and vegetable products with the addition of kelp.
7. Substantiation and development of innovative technology of freshwater fish hatching.

### Curriculum of Master training in educational program "Technologies of Storage and Reprocessing of Aquatic Bioresources" (educational and professional program of master's training)

| Code<br>n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits | The final<br>control |
|--|---|----------------------|----------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                   |   |                      |                      |
| <b>Compulsory components of EPP</b>                |   |                      |                      |
| CC 1   | Protection of labor in the branch-industry  | 4                    | examination          |
| CC 2   | Business foreign language   | 3                    | examination          |
| CC 3   | Psychology of management  | 3                    | examination          |
| CC 4   | Agrarian policy   | 3                    | examination          |
| <b>Optional components of EPP</b>                  |   |                      |                      |
| <i>Optional subjects by Student's Choice</i>       |   |                      |                      |
| OB 1   | Selective discipline 1  | 4                    | examination          |
| OB 2   | Selective discipline 1  | 4                    | examination          |
| <b>2. SPECIAL (PROFESSIONAL) CYCLE OF TRAINING</b> |   |                      |                      |
| <b>Compulsory components of EPP</b>                |   |                      |                      |
| CC 5   | Modern methods of investigation used in the branch-industry   | 5                    | examination          |
| CC 6   | Actual problems of the branch-industry  | 7                    | examination, CP      |
| CC 7   | Modern technologies of storage and preservation of fish   | 7                    | examination, CP      |



| Code n/a  | Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|---|---|-------------------|-------------------|
|   | products  |                   |                   |
| CC 8  | Technology of protein products from fish and seafood  | 5                 | examination, CP   |
| CC 9  | Exploitation of technological equipment   | 5                 | examination       |
| CC 10   | Technologies character by economic spending of resources  | 4                 | examination       |
| CC 11   | Optimization of processes of manufacturing  | 4                 | examination       |
| CC 12   | Food quality and safety management  | 3                 | examination       |
| CC 13   | Production management   | 3                 | examination       |
| <b>Optional components of EPP</b>                           |   |                   |                   |
| <i>Optional Block by speciality</i>                         |   |                   |                   |
| <i>Optional Block 1 "Innovative nutrition technologies"</i> |   |                   |                   |
| OB 1.1  | Microstructural analysis of fish and seafoods   | 4                 | examination       |
| OB 1.2  | International and regional standardization and certification  | 4                 | examination       |
| OB 1.3  | Biologically active substances produced of fish and seafood   | 4                 | examination       |
| OB 1.4  | Philosophy of science and innovation development  | 4                 | examination       |
| <i>Optional Block 2 "Functional Nutrition"</i>              |   |                   |                   |
| OB 2.1  | Special technologies  | 4                 | examination       |
| OB 2.2  | Global trends in the food industry  | 4                 | examination       |
| OB 2.3  | Modern technologies of food storage and preservation  | 4                 | examination       |
| OB 2.4  | Philosophy of science and innovation development  | 4                 | examination       |
| <b>The total amount of compulsory components</b>            |   | <b>56</b>         |                   |
| <b>The total amount of optional components</b>              |   | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                           |   |                   |                   |
| CC 14   | Practical training  | 5                 | examination       |
| CC 15   | Preparation of diploma and protection of the master's degree  | 5                 | examination       |
| <b>THE TOTAL AMOUNT OFF EPP</b>                             |   | <b>90</b>         |                   |

## Annotations of training disciplines

### 1. GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Protection of labor in the branch-industry.** Methods and means used in protection and strengthening of health, prophylactics of sicknesses and ensuring of capability to work by norms legalized in the branch-industry. Principles of choose of procedures of physical training, putting of them in special complexes and sequence of use by destination. Healthy mode of life. Methods and means of development of important psychophysical characters. Methods of psychophysical training. Rules of work in avoiding of physical overfatigue, stale, overstraining and other crisis manifestations. Methods of self-control of state of health, grade of physical development and normality of functioning of systems of organism.

**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.

**Psychology of management.** Learning of theory and practice of conditions and factors, moving forces and determinants of development of individuality as managers, specificity of motivation of the administrative person, adaptive processes in microsocium, types of managers and styles of 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.

## 2. SPECIAL (PROFESSIONAL) CYCLE OF TRAINING

### Compulsory components of EPP

**Modern methods of investigation used in the branch-industry.** The program of training presumes studying of basic principles of methodology of carrying out of investigations in the industry by producing of foods, modern norms of classification of experiments, methods of choose, systematization and analysis of scientific information and results of R&D works, as well as acquainting with rules of drawing up of results of research and protection of rights on intellectual property.

**Actual problems of the branch-industry.** The program of training presumes studying of problems, which arise in operation by norms of modern theory and practice of operation of businesspersons by procedures of actual, economical and environmentally friendly technologies of producing and prolongation of term of safe storage of new types of meat and combined products based on its use.

**Modern technologies of storage and preservation of fish products.** The program of training presumes acquainting with the modern state and perspectives of development of technologies of storage and preservation of fish and seafood; principles of preservation; characteristic of principal methods of saving of quality of live fish; modern methods of cooling of fish and seafood; methods of preservation of quality of frozen semi-manufactured products and culinary fabrics; procedures of sterilization and pasteurization of fish products.

**Technology of albuminous products produced of fish and seafood.** The program of training presumes studying of theoretical and practical problems of modern technologies of fabrication of albuminous masses, pastes, concentrates, hydrolizates, structured, emulsified and multicomponent products of regulated composition and structure, choose of optimum variants of operation in concrete natural and economic conditions done in purposes of widening of assortment of production and expanding of its output, as well as methods of rising of effectiveness of use of raw materials.

**Exploitation of technological equipment.** The program of training presumes studying by students of theoretical and practical problems, which arise in realization of typical processes of exploitation of technological equipment used in meat industry, rules of its repair and assembling.

**Technologies character by economic spending of resources.** The program of training presumes learning of fundamentals of theory, directions of progress and innovative technologies of reprocessing of secondary raw materials and wastes of alimentary and reprocessing enterprises, which operate in the agricultural sector of economy, into the energy resource materials, forages, fertilizers, food additives,

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construction materials and other goods of mass use, what assists in creation of conditions of the full use of natural resources.

**Optimization of processes of manufacturing.** The training program of this course presumes studying of theoretical and practical problems of optimization of typical situations occurred in the branch-industry. The principal goal to reach is identification of optimum conditions of doing of this work in choosing of suitable criteria of quality of accomplishing of technological process to optimize. the students would obtain in process of training the basic knowledge on methods of optimization of typical stages of producing of foods, choose the most influential of these operations and learn to develop the optimum parameters of technological processes and apparatus to use in their realization.

**Food quality and safety management.** The program provides for the study of the requirements of the Laws of Ukraine and regulations on the quality and safety of agricultural products and food raw materials; study of maximum permissible levels of safety indicators in accordance with national, European and international normative documents for different types of agricultural products. products, DSTU ISO 14000 standards for environmental protection for processing and agricultural enterprises.

Mastering the practical skills of developing quality and safety management systems for feed and agricultural products at all stages of its production according to ISO 9000 DSTU and based on HACCP principles.

**Production management.** The subject of the discipline is the formation of students' competence in the basic principles, basic categories, modern concepts, theoretical provisions and practical methods of managing the basic activity of enterprises and the ability to develop a production strategy, the creation and use of industry production subsystems as a basis for ensuring the mission of the organization.

### **Optional components of EPP**

#### *Optional Block by speciality*

#### *Optional Block 1 "Innovative nutrition technologies"*

**Microstructural analysis of fish and seafoods.** Program of training is centered on learning by students of fundamentals of microstructural methods of analysis of fish and seafoods, what has to give them the capability to evaluate their quality at any technology of their storage.

**International and regional standardization and certification.** standardization is the most effective means of rising of effectiveness of manufacture and betterment of quality of production at the modern stage of development of human community and its productive capacities. Certification, in turn, is the important means of rising of demand for the consumables both in Ukraine and abroad. Use of procedures of certification permits to rise the competitiveness of production, stimulate efforts in development of new non-traditional products, especially the agricultural ones, that would have the unique properties and satisfy demands of consumers to quality and reliability of production they bought. Use of practice of certification of quality systems permits also to augment volumes of international barter by goods and services.

**Biologically active substances produced of fish and seafood.** The training program of this course presumes studying of characteristics of biologically active substances contained in various hydrobionts, theoretical substantiation and technological base of processes of extraction of biologically active substances from fish and hydrobionts, and acquainting with general methods of control of their quality.

**Philosophy of science and innovation 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 postnonclassical ideals of scientism. Methodology of perception of

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scientific and innovative activity. Study of basic scientific forms. Value of basic and applied research strategies. Philosophical foundations of classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of scientific worldview. Logic of scientific research in the context of contemporary global issues (environmental, technological and social). Axiological dimension of science: the problem of responsibility of the scientist.

*Optional Block 2 "Functional nutrition"*

**Special technologies.** Acquaintance with innovations in the field of agricultural production, studying of methods of introduction of innovative development at the enterprises of processing and food industry.

**Global trends in the food industry.** Acquisition of knowledge of the basics of industrial food technologies 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 preservation.** The program provides for the study of the main provisions on the current state and prospects for the development of technologies for the storage and preservation of food; characterization of preservation principles: biosis, anabiosis, abiosis; ways of canning; characterization of the main methods and methods of preserving the quality of raw materials and foodstuffs; characterization of modern methods of freezing of raw materials and foodstuffs; frozen semis and culinary products; sterilization, pasteurization of food products.

**Philosophy of science and innovative development.** Philosophical and scientific approaches to the study of science and innovation. Philosophy of science: ontological, epistemological, epistemological dimension. Forms of organization of science. Classical, non-classical and post-non-classical ideals of science. Methodology of cognition of scientific and innovative activity. Study of basic scientific forms. The value of fundamental and applied research strategies. Philosophical principles of classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of the scientific picture of the world. The logic of scientific research in the context of global problems of the present (environmental, technogenic and social). The axiological dimension of science: the problem of scientist responsibility.

**Training of masters of sciences  
of sphere of knowledge of "Manufacturing and related technologies"  
of specialty of 181 "FOOD TECHNOLOGIES"  
by educational program "NUTRITIONOLOGY"**

|  |  |
|--|--|
| Form of Training:                          | Licensed number of persons:  |
| – daytime                                  | 15   |
| Term of training:                          |  |
| – daytime educational and research program | 2 years  |
| Credits ESTS:                              |  |
| – educational and research program         | 120  |
| Language of training                       | Ukrainian, English   |
| Qualification of graduates                 | Masters of sciences (technologies of storage and reprocessing of aquatic bioresources) |

**Concept of training**

The main task of the nutritionist is the selection of effective, correct and balanced nutrition, which will improve the general health of the person and contribute to the treatment of diseases of the digestive system. The nutritiologist should take into account the health of each particular patient, constantly monitor changes in his body and, based on these data, make changes to the diet. In addition, the nutritionist assigned the function of familiarizing the population with the basic principles of healthy eating and his training to correctly use the knowledge gained in everyday life.

Training of specialists— high-levelnetriologists is a complicated task;it needs not only qualified professors,but also modern equipment, practical classes and the possibility of conducting independent research.

In addition, career of the nutritionist requires the specialist of this profile with responsibility, friendliness, sociability, the ability to easily master new knowledge, methods and methodical approaches.

**Spheres of employment of graduates**

Graduates are able to carry out 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, consulting, consulting, design and design organizations and institutions; subdivisions of state and municipal government bodies according to the National Classifier of Ukraine "Classification of professions" Nc(state classifier)003: 2010.

The specialist is trained to work in companies, small enterprises and institutes of technological, social, medical and health care sectors (ensuring the quality of food safety systems, managing programs aimed at improving the well-being of people in health, education, culture, sports, recreation, environmental protection, provision of social services).

Training young prospective 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 with practical experience with real projects in the field of healthy food, Wellness and SPA industry; nutritionists and nutrition consultants who know how to provide a healthy lifestyle, prepare and enjoy delicious, healthy food.

### Practical training

Practical student education is an integral part of the educational process of training specialists in the Master's Degree program in the Nutrition Program. Practical training involves work at leading enterprises, organizations, institutions of Ukraine; long-term summer internships, trainings and internships abroad.

### Proposed Topics for Master Theses

1. Justification of rations of complex family nutrition for the purpose of prevention of the most widespread diseases in Ukraine.
2. Development of a system of dietary nutrition for children of the children's camp "Chaika" of the Kiev region.
3. Development of the concept of sauce studio
4. Scientific and practical substantiation of the development of the diet of athletes.
5. Scientific and practical basis for the development of special-purpose rations and technologies
6. Scientific and technical bases of rational organization of nutrition of student youth in NULES of Ukraine on the basis of student canteen.
7. Scientific rationale for the diets of soldiers
8. Scientific and practical substantiation of the technology of production of frozen culinary semi-finished products of health purpose.

### Curriculum of Master training in educational program "Nutritionology" (educational and research program of master's training)

| Code n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits | The final<br>control |
|---|---|----------------------|----------------------|
| <b>1. GENERAL TRAINING CYCLE</b>  |   |                      |                      |
| <b>Compulsory components of ERP</b>                                     |   |                      |                      |
| CC 1  | Protection of labor in the branch-industry  | 4                    | examination          |
| CC 2  | Psychology of management  | 4                    | examination          |
| CC 3  | Food Chemistry  | 6                    | examination          |
| CC 4  | Business foreign language   | 4                    | examination          |
| CC 5  | Philosophy of science and innovation development  | 4                    | examination          |
| <b>Optional components of ERP</b>                                       |   |                      |                      |
| <i>Optional subjects by Student's Choice</i>                            |   |                      |                      |
| OB 1  | Selective discipline 1  | 4                    | examination          |
| OB 2  | Selective discipline 1  | 4                    | examination          |
| <b>2. SPECIAL (PROFESSIONAL) CYCLE OF TRAINING</b>                      |   |                      |                      |
| <b>Compulsory components of ERP</b>                                     |   |                      |                      |
| CC 5  | Food law and policy   | 4                    | examination          |
| CC 6  | Nutrition physiology and epigenetics  | 6                    | examination, CP      |
| CC 7  | Hygiene, toxicology and nutrition   | 7                    | examination          |
| CC 8  | Nutrition of healthy eating   | 8                    | examination, CP      |
| CC 9  | Feeding different categories of population  | 8                    | examination          |
| CC 10   | Healthy eating technology   | 6                    | examination, CP      |
| CC 11   | Production management   | 30                   | examination          |
| CC 12   | Agrarian policy   | 3                    | examination          |
| <b>Optional components of ERP</b>                                       |   |                      |                      |
| <i>Optional Block by speciality</i>                                     |   |                      |                      |
| <i>Optional Block 1 "Healthy eating, health and fitness technology"</i> |   |                      |                      |
| OB 1.1  | Microbiota, probiotics and prebiotics   | 4                    | examination          |
| OB 1.2  | Ethics in nutrition   | 4                    | examination          |



| Code n\а                                  | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits | The final<br>control |
|---|---|----------------------|----------------------|
| OB 1.3                                    | Sports and preventive nutrition   | 4                    | examination, CP      |
| OB 1.4                                    | Nutritional and dietary supplements   | 4                    | examination          |
| OB 1.5                                    | Food quality and safety management  | 3                    | examination          |
| OB 1.6                                    | Organization of scientific work preparation   | 3                    | examination          |
| Optional Block 2 "Functional Nutrition"   |   |                      |                      |
| OB 2.1                                    | Health advertising  | 4                    | examination          |
| OB 2.2                                    | Molecular technology of health products   | 4                    | examination          |
| OB 2.3                                    | Technology of products of therapeutic and prophylactic<br>purpose   | 4                    | examination, CP      |
| OB 2.4                                    | Innovative technologies in nutrition  | 4                    | examination          |
| OB 2.5                                    | Food quality and safety management  | 3                    | examination          |
| OB 2.6                                    | Organization of scientific work preparation   | 3                    | examination          |
| The total amount of compulsory components |   | 67                   |                      |
| The total amount of optional components   |   | 30                   |                      |
| 3. OTHER TYPES OF TRAINING                |   |                      |                      |
| CC 13                                     | Practical training  | 16                   | examination          |
| CC 14                                     | Preparation of diploma and protection of the master's<br>degree   | 7                    | examination          |
| THE TOTAL AMOUNT OFF ERP                  |   | 120                  |                      |

### Annotations of training disciplines

#### 1. GENERAL TRAINING CYCLE Compulsory components of ERP

**Modern methods of investigation used in the branch-industry.** The program of training presumes studying of basic principles of methodology of carrying out of investigations in the industry by producing of foods, modern norms of classification of experiments, methods of choose, systematization and analysis of scientific information and results of R&D works, as well as acquainting with rules of drawing up of results of research and protection of rights on intellectual property.

**Management Psychology.** Theoretical and practical preparation of students for a deeper understanding of conditions and factors, driving forces and determinants of personality development, as a subject of management, the specifics of the motivational sphere of the leader, adaptive processes in the micro-society, types of leaders, leadership styles.

**Food Chemistry.** The 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 the general patterns of these transformations. It involves investigating the relationship between the structure and properties of nutrients and their impact on the properties and nutritional value of foods.

**Business Foreign Language.** The overall objective of the foreign language teaching program is to develop professional language competences for students, which will facilitate their effective functioning in the cultural diversity of the educational and professional environment. The methods of finding 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 extension of lexical and grammatical skills. Methods and linguistic peculiarities of annotating and abstracting of foreign language sources, basics of translation of 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,

epistemological, epistemological dimension. Forms of organization of science. Classical, non-classical and post-non-classical ideals of science. Methodology of cognition of scientific and innovative activity. Study of basic scientific forms. The value of fundamental and applied research strategies. Philosophical principles of classification of sciences. Philosophy of technology: theoretical and methodological aspects. Philosophical understanding of the scientific picture of the world. The logic of scientific research in the context of global problems of the present (environmental, technogenic and social). The axiological dimension of science: the problem of scientist responsibility.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of ERP

**Food law and policy.** The main provisions of the regulations governing healthy eating; the main provisions of the Law of Ukraine "On the safety and quality of food and raw materials", the Law of Ukraine "On milk and dairy products", "On fish, by-products and food products from them", "On withdrawal from circulation, processing, disposal, destruction or further use of substandard and dangerous products", "On protection of the population against infectious diseases", "On protection of consumer rights". Legal bases of activity of the nutrition specialist.

**Physiology and epigenetics of human 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 regularities of the life of the organism at different stages of ontological and phylogenesis in interaction with the environment in the dynamics of life.

**Hygiene, toxicology and nutrition.** Hygienic requirements for industrial and environmental conditions, problems of human interaction with the environment, basic laws of hygiene science and general patterns of communication of health with the factors and conditions of the living environment; environmental factors and their compliance with natural levels and hygiene standards; conducting toxicological and hygienic experiment, which students acquire in the course of performing laboratory work; conducting hygienic examination of certain types of products and projects. Alimentary Toxicology - the theory and methodology of contaminant rationing in food; determination of alimentary risks of morbidity; peculiarities of rationing of chemicals and radioactive substances in food and drinking water. Hygienic evaluation and regulation of transgenic food.

**Nutrition of healthy human nutrition.** Nutrition, food, nutrients and other components contained in products, their effects and interactions, rates of consumption, absorption, loss and excretion, their impact on various types of metabolism and importance in maintaining health or disease.

**Feeding different categories of population.** Hygienic principles of nutrition of certain groups of the population. nutrition for children of different age groups. peculiarities of nutrition of persons of intellectual labor, workers of industrial enterprises, workers of agriculture; nutrition of athletes, elderly and elderly; nutrition requirements for pregnant and breastfeeding mothers; unconventional types of food (vegetarian food, macrobiotic nutrition, nutrition in the system of yoga teaching, separate nutrition, whey eating, fasting as a diet method, nutrition by blood groups, nutrition by Ayurveda).

**Healthy eating technology.** Theoretical and practical knowledge of the ingredient composition of functional food products, their nutritional value and health impact on the human body; new technologies for the production of health food products, including for individually selected groups of the population. Types of biological effects of food and varieties of nutrition. Axioms of biological being of man and principles of rational nutrition.

**Production management.** The subject of study of discipline is the formation of students' competence in basic principles, basic categories, modern concepts, theoretical

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provisions and practical methods of managing the basic activity of enterprises and ability to develop a production strategy, create and use industry production subsystems as a basis for ensuring the mission of the organization.

**Agrarian policy.** This discipline acquaints future specialists with the basics of agricultural policy-making, gives an opportunity to master methodological and methodological bases of development and implementation of a set of measures to support and ensure the development of agriculture in the system of inter-sectoral links in the national economy, as well as to evaluate from the standpoint of theory the practical actions state structures for regulating agricultural production in the country.

### **Optional components of ERP**

#### *Optional Block by speciality*

#### *Optional Block 1 "Healthy eating, health and fitness technology"*

**Microbiota, probiotics and prebiotics.** General terms in human microecology, composition and functions of microflora of different human biotopes; general concepts about normoflora preparations; basic requirements for probiotic microorganisms; basic technologies of production of normo-flora preparations and functional nutrition products based on probiotic microorganisms; requirements for preparations of normoflora.

A modern look at the role of pro- and prebiotic drugs. Topicality of creation of domestic polycomponent probiotic preparations. Human microbial ecological system. Physiological functions of normal microflora. List of probiotics, prebiotics registered in Ukraine. Classification of prebiotic components. Clinical use of probiotic preparations.

**Ethics in nutrition.** Organizing the nutrition system of healthy and sick person at different age stages by applying modern scientific provisions of nutriscology and nutrition in medical-preventive, health-improving and educational institutions, as well as methods of prevention with the help of specially selected diet.

**Sports and preventive nutrition.** Theoretical and practical aspects of the impact of nutrition on the health of people in different groups; basics of rational nutrition; theoretical and practical basics of preventive nutrition; properties of individual food groups and their importance for health promotion. Ways to preserve and promote health through healthy, rational preventative nutrition.

**Nutritional and dietary supplements.** Formation of necessary theoretical knowledge about nutritional and dietary supplements, their classification, composition, role in food technology and nutrition, assessment in terms of toxicology and medical and biological requirements.

**Food quality and safety management.** The program provides for the study of the requirements of the Laws of Ukraine and regulations on the quality and safety of agricultural products and food raw materials; study of maximum permissible levels of safety indicators in accordance with national, European and international normative documents for different types of agricultural products. products, DSTU ISO 14000 standards for environmental protection for processing and agricultural enterprises.

Mastering the practical skills of developing quality and safety management systems for feed and agricultural products at all stages of its production according to ISO 9000 DSTU and based on HACCP principles.

**Organization of scientific work preparation.** Providing students with knowledge on classification of sciences, scientific and technical potential, organization of research activities in Ukraine, organizational bases of scientific researches, basic scientific methodologies and methods, special methods of research.

*Optional Block 2 "Functional Nutrition"*

**Health advertising.** Effective formation of a healthy lifestyle, as well as preservation and promotion of one's own health by improving the individual's living conditions on the basis of rational nutrition.

**Molecular technology of health products.** Study of the role of individual biocomponents in the life of the human body and study the features of technologies for the production of new generation of food with predetermined properties, acquainting students with new methods of processing natural functional raw materials, as sources of the necessary functional ingredients, the formation of students and theoretical students and practitioners science-based positions to analyze and improve the technology of food production of the new Poko innya specific production conditions.

**Technology of products of therapeutic and prophylactic purpose.** It covers the study of the following main objects: groups of functional components that are part of the food systems, their health value in the process of preventive and therapeutic nutrition; major groups of wellness foods and functional drinks.

**Innovative technologies in nutrition.** Formation of students' theoretical foundations and practical food production skills based on innovative technologies used in the modern food industry and based on the results of scientific research in the field.

**Food quality and safety management.** The program provides for the study of the requirements of the Laws of Ukraine and regulations on the quality and safety of agricultural products and food raw materials; study of maximum permissible levels of safety indicators in accordance with national, European and international normative documents for different types of agricultural products. products, DSTU ISO 14000 standards for environmental protection for processing and agricultural enterprises.

**Mastering the practical skills of developing quality and safety management systems for feed and agricultural products at all stages of its production according to ISO 9000 DSTU and based on HACCP principles.**

**Organization of scientific work preparation.** Providing students with knowledge on classification of sciences, scientific and technical potential, organization of research activities in Ukraine, organizational bases of scientific researches, basic scientific methodologies and methods, special methods of research.

## **FACULTY OF CONSTRUCTION AND DESIGN**

**Dean** – Ph.D. (Technical Sciences), associate professor Ruzhylo Zynoviy Volodymyrovych

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 "Sevel Engineering"**

#### ***Educational program "Machinery and equipment of agricultural production"***

Guarantor of the educational and professional program - Doctor of Technical Sciences, Professor Romasevych Yurii Oleksandrovych

Guarantor of the educational and research program - Doctor of Technical Sciences, Professor Loveikin Viacheslav Serhiiovych

Diploma Departments:

#### **Constructing of Machines and equipment**

Tel.: +38 (044) 527-87-34,

E-mail: machinebuild\_centre@twin.nauu.kiev.ua

Head of department – Doctor of Technical Sciences, professor Loveykin Vyacheslav Serhiiovych

#### **Reliability of machinery**

Tel.: +38 (044) 527-87-71

E-mail: novitskiyAV@ukr.net

Head of department – Ph.D. (Technical Sciences), associate professor Novitskiy Andriy Valentynovych

#### **Tractors, cars and bioenergy systems**

Tel.: +38 (044) 527-88-95

E-mail: vvchuba@ukr.net

Head of the Department - Candidate of Technical Sciences, Associate Professor Chuba Viacheslav Volodymyrovych

#### ***Educational program "Forest Complex Equipment"***

Guarantor of the educational and professional program - Doctor of Technical Sciences, Professor Lopatko Konstantyn Heohriiovych

Diploma Departments:

#### **Constructing of Machines and equipment**

Tel.: +38 (044) 527-87-34,

E-mail: machinebuild\_centre@twin.nauu.kiev.ua

Head of department – Doctor of Technical Sciences, professor Loveykin Vyacheslav Serhiiovych

**Reliability of machinery**

Tel.: +38 (044) 527-87-71

E-mail: novitskiyAV@ukr.net

Head of department – Ph.D. (Technical Sciences), associate professor Novitskiy Andriy Valentynovych

***Educational program "Technical service of machines and equipment of agro-industrial complex"***

Guarantor of the educational and professional program - Candidate of Technical Sciences, Associate Professor Novitskiy Andriy Valentynovych

Diploma Departments:

**Reliability of machinery**

Tel.: (044) 527-87-71

E-mail: reliability\_chair@twin.nauu.kiev.ua

Head of department – Ph.D. (Technical Sciences), associate professor Novitskiy Andriy Valentynovych

**Constructing of Machines and equipment**

Tel.: (044) 527-87-34

E-mail: machinebuild\_centre@twin.nauu.kiev.ua

Head of department – Doctor of Technical Sciences, professor Loveykin Vyacheslav Serhiiovych

**Specialty 192 "Industrial and Civil Engineering"**

***Educational program "Construction and civil engineering"***

Guarantor of the educational and professional program - Candidate of Technical Sciences, Associate Professor Bakulin Evgeniy Anatoliiovych

Guarantor of the educational and research program - Candidate of Technical Sciences, Professor Yarmolenko Mykola Hryhorovych

Diploma Departments:

**Construction**

Tel.: (044) 527-83-92

E-mail: bakulin959@ukr.net

Head of department – Ph.D. (Technical Sciences), associate professor Bakulin Evgeniy Anatoliiovych

**Mechanics**

Tel.: (044) 527-83-25

E-mail: berezovyi@nubip.edu.ua

Head of department – Ph.D. (Technical Sciences), associate professor Berezovy Mykola Heorhriiovych



**Training of masters of sciences  
from the field of knowledge "Mechanical Engineering"  
specialty 133 "SECTORAL ENGINEERING"  
for the educational program "MACHINES AND EQUIPMENT OF  
AGRICULTURAL PRODUCTION"**

|  |                                      |
|--|--------------------------------------|
| Type of studying:                                | Licensed persons:                    |
| – full-time studying                             | 50                                   |
| – part-time studying                             | 50                                   |
| Duration of studying:                            |                                      |
| - full-time educational and professional program | 1,5 years                            |
| - full-time educational and research program     | 2 years                              |
| – part-time program                              | 1,5 years                            |
| Credits:   |                                      |
| – educational and professional program           | 90                                   |
| – educational and research program               | 120                                  |
| Language   | Ukrainian, English, German           |
| Academic degree                                  | Engineer-Designer, Research Engineer |

**Concept of training**

Training of masters in specialty 133 "Sectoral 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 and 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.

**Occupation 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.

### **Educational and 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.

### **Occupation of graduates**

Graduates with the qualification "engineer-researcher" 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.

### **Examples of Master's Thesis Subjects**

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.

**Curriculum of Master training  
in educational program "Machinery and equipment of agricultural production"  
(educational and professional program of Master's training)**

| Code n/a                                   | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits | The final<br>control |
|--|---|----------------------|----------------------|
| 1. GENERAL TRAINING CYCLE                  |   |                      |                      |
| Optional components of EPP                 |   |                      |                      |
| Optional subjects by Student's Choice      |   |                      |                      |
| OB 1                                       | Applied computer technologies   | 4                    | exam                 |
| OB 2                                       | Fundamentals of scientific research   | 4                    | exam                 |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE   |   |                      |                      |
| Compulsory components of EPP               |   |                      |                      |
| CC 1.                                      | Mechanics of structures of technical systems  | 5                    | exam                 |
| CC 2.                                      | Reliability of technical systems  | 4                    | credit               |
| CC 3.                                      | Systems of automated designing  | 5                    | exam, KP             |
| CC 4                                       | Energy-ecological valuation of machines design  | 5                    | credit, exam         |
| CC 5                                       | Mechatronic   | 6                    | credit, exam         |
| CC 6                                       | Testing of agricultural technique   | 4                    | exam                 |
| CC 7                                       | Theory of technical systems   | 5                    | exam, KP             |
| Optional components EPP                    |   |                      |                      |
| Optional Block by choice of specialty      |   |                      |                      |
| OB 1.1.                                    | Design of vibration machines  | 4                    | exam                 |
| OB 1.2.                                    | Design of machinery and equipment in animal husbandry   | 4                    | exam                 |
| OB 1.3.                                    | Designing of machines and equipment in bioenergy  | 4                    | exam                 |
| OB 1.4.                                    | Reliability of agricultural machines  | 5                    | exam, KP             |
| OB 1.5.                                    | Methods of construction of parts of agricultural machines   | 5                    | exam                 |
| OB 1.6.                                    | Economics of technological systems  | 4                    | credit               |
| The total amount of compulsory components: |   | 34                   |                      |
| The total amount of optional components    |   | 34                   |                      |
| 3. OTHER TYPES OF TRAINING                 |   |                      |                      |
| CC 8                                       | Practical trainings   | 16                   | credit               |
| CC 9                                       | Preparation and defense of master's work  | 6                    | -                    |
| THE TOTAL AMOUNT OF EPP                    |   | 90                   |                      |

**Curriculum of Master training  
in educational program "Machinery and equipment of agricultural production"  
(Educational and research program of master's training)**

| Code n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper), practice,<br>qualification work) | Amount of<br>credits | The final<br>control |
|---|---|----------------------|----------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                |   |                      |                      |
| <b>Optional components of ERP</b>               |   |                      |                      |
| <i>Optional subjects by Student's Choice</i>    |   |                      |                      |
| OB 1  | Applied computer technologies   | 4                    | exam                 |
| OB 2  | Fundamentals of scientific research   | 4                    | exam                 |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |   |                      |                      |
| <b>Compulsory components of ERP</b>             |   |                      |                      |
| CC 1.   | Mechanics of structures of technical systems  | 5                    | exam                 |
| CC 2.   | Reliability of technical systems  | 4                    | exam                 |
| CC 3.   | Systems of automated designing  | 5                    | exam, KP             |
| CC 4  | Energy-ecological valuation of machines design  | 5                    | credit, exam         |
| CC 5  | Mechatronic   | 6                    | credit, exam         |
| CC 6  | Testing of agricultural technique   | 4                    | exam                 |

| Code n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper), practice,<br>qualification work) | Amount of<br>credits | The final<br>control |
|---|---|----------------------|----------------------|
| CC 7  | Theory of technical systems   | 5                    | exam, KP             |
| CC 8.   | Dynamics and optimization of machines   | 3                    | exam                 |
| CC 9.   | Theory and methodology of scientific research   | 3                    | exam                 |
| CC 10.  | Economics of technological systems  | 4                    | exam, KP             |
| <b>Optional components ERP</b>                    |   |                      |                      |
| <i>Optional Block by choice of specialty</i>      |   |                      |                      |
| OB 1.1.   | Design of vibration machines  | 4                    | exam                 |
| OB 1.2.   | Design of machinery and equipment in animal husbandry   | 4                    | exam                 |
| OB 1.3.   | Designing of machines and equipment in bioenergy  | 4                    | exam                 |
| OB 1.4.   | Reliability of agricultural machines  | 5                    | exam, KP             |
| OB 1.5.   | Economics of technological systems  | 4                    | exam                 |
| OB 1.6.   | Methods of construction of parts of agricultural machines   | 5                    | exam                 |
| OB 1.7.   | The theory of mechatronic systems of agricultural machines  | 3                    | exam                 |
| OB 1.8.   | Theoretical and experimental methods of modeling machine aggregates   | 3                    | exam                 |
| OB 1.9.   | Biomechanics  | 3                    | exam                 |
| OB 1.10.  | Technical support of biotechnological processes   | 3                    | exam                 |
| <b>The total amount of compulsory components:</b> |   | <b>47</b>            |                      |
| <b>The total amount of optional components</b>    |   | <b>46</b>            |                      |
| <b>3. OTHER TYPES OF TRAINING</b>                 |   |                      |                      |
| CC 11   | Scientific Research Practice  | 15                   | credit               |
| CC 12   | Practical trainings   | 6                    | credit               |
| CC 13   | Preparation and defense of master's work  | 6                    |                      |
| <b>THE TOTAL AMOUNT OF ERP</b>                    |   | <b>120</b>           |                      |

### Annotation of disciplines of the curriculum

#### 1. GENERAL TRAINING CYCLE

##### Optional components

##### *Optional subjects by Student's Choice*

**Applied computer technologies.** Studying this discipline allows to increase the applied educational, theoretical and practical-professional level of future masters of engineers by means of their knowledge of modern applied computer technologies of various technological systems, assimilation of functional capabilities and methods of use, mastering the necessary techniques and practical skills of performing works with the use of applied computers' computer technologies for the production purpose of agricultural machine-building.

**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, the stages of research, the organization of the experiment, the basis of the invention, in particular the issue of the application for the invention, as well as methods of statistical processing experimental data.

#### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

##### Compulsory components

**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.

**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.

**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.

**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.

**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.

**Testing of agricultural technique.** The course in this discipline is aimed at studying the engineering methods of tests of agricultural techniques that allow obtaining an objective assessment of the structural, technological and operational properties of the technology and determine their compliance with the technical tasks and operational requirements of the work processes.

**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.

### **Optional components EPP**

#### *Optional Block by choice of specialty*

**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.

**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

**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.

**Reliability of agricultural machines.** It is a complex discipline that studies the regularities of change of a technical condition of machines and their elements in the process of exploitation, studies the implementation of methods and ways of elimination of defects and damages, discloses the methods of making surfaces of the parts necessary physical-mechanical properties by: surfacing, spraying, use of polymers, electroplating, plastic deformation, electrical methods of processing and restore the health of agricultural machinery.

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**Methods of construction of parts of agricultural machines.** The discipline course is aimed to study of existing methods of constructing of parts of agricultural machines, mastering of functionality and their usage patterns, mastering the essential techniques and practical skills of performance of works with application of methods for designing of industrial purpose agricultural machinery.

**Economics of technological systems.** The economic aspects of making design decisions are considered in order to maximize the benefits. Practical classes in the discipline envisage students mastering the economic bases of production in the conditions of agro-industrial enterprises.

### **Optional components ERP**

#### *Optional Block by choice of specialty*

**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.

**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

**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.

**Reliability of agricultural machines.** It is a complex discipline that studies the regularities of change of a technical condition of machines and their elements in the process of exploitation, studies the implementation of methods and ways of elimination of defects and damages, discloses the methods of making surfaces of the parts necessary physical-mechanical properties by: surfacing, spraying, use of polymers, electroplating, plastic deformation, electrical methods of processing and restore the health of agricultural machinery.

**Economics of technological systems.** The economic aspects of making design decisions are considered in order to maximize the benefits. Practical classes in the discipline envisage students mastering the economic bases of production in the conditions of agro-industrial enterprises.

**Methods of construction of parts of agricultural machines.** The discipline course is aimed to study of existing methods of constructing of parts of agricultural machines, mastering of functionality and their usage patterns, mastering the essential techniques and practical skills of performance of works with application of methods for designing of industrial purpose agricultural machinery.

**The theory of mechatronic systems of agricultural machines.** 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.

**Theoretical and experimental methods of modeling machine aggregates.** This is a complex discipline that studies the methods of modeling objects that interact with each other and the external environment in order to predict the reaction of the object to control effects, to analyze its sensitivity to various factors while maintaining in the mathematical description of the physical adequacy of the real object.

**Biomechanics.** The course in this discipline is aimed at familiarizing with the main provisions and directions of the use of biomechanics as a prototype of the machine structure.

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**Training of masters of sciences  
the field of knowledge "Mechanical Engineering"  
specialty 133 "SECTORAL ENGINEERING"  
for the educational program "FOREST COMPLEX EQUIPMENT"**

|  |                    |
|--|--------------------|
| Type of studying:                                | Licensed persons:  |
| – full-time studying                             | 50                 |
| Duration of studying:                            |                    |
| – full-time educational and professional program | 1,5 years          |
| Credits ECTS:                                    |                    |
| – educational and professional program           | 90                 |
| Language   | Ukrainian, English |
| Academic degree                                  | Engineer-Mechanic  |

### **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 and professional training program**

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.

### **Occupation 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.

### Examples of Master's Thesis Subjects

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 and professional program of Master's training)

| Code n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits | The final<br>control |
|---|---|----------------------|----------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                  |   |                      |                      |
| <b>Optional components of EPP</b>                 |   |                      |                      |
| <i>Optional subjects by Student's Choice</i>      |   |                      |                      |
| OB 1  | Applied computer technologies of machines for forestry  | 4                    | exam                 |
| OB 2  | Fundamentals of scientific research   | 4                    | exam                 |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>   |   |                      |                      |
| <b>Compulsory components of EPP</b>               |   |                      |                      |
| CC 1.   | Dynamics of machines for forestry   | 5                    | exam, KP             |
| CC 2.   | Automated design systems  | 5                    | exam, KP             |
| CC 3.   | Reliability of machines for forestry  | 4                    | exam                 |
| CC 4  | Energy ecological assessment of forest complex equipment design   | 5                    | credit, exam         |
| CC 5  | Mechatronic systems of machines for forestry  | 8                    | credit, exam         |
| CC 6  | Testing of forest complex equipment   | 3                    | exam                 |
| CC 7  | Theory and designing of machines for forestry   | 4                    | exam                 |
| <b>Optional components EPP</b>                    |   |                      |                      |
| <i>Optional Block by choice of specialty</i>      |   |                      |                      |
| OB 1.1.   | Designing of technical systems for forestry (vibration action)  | 4                    | exam                 |
| OB 1.2.   | Designing of technical systems for forestry   | 5                    | exam                 |
| OB 1.3.   | Reliability of machines for forestry  | 7                    | exam, KP             |
| OB 1.4.   | Methods of designing the working bodies of machines for forestry  | 6                    | exam                 |
| OB 1.5.   | Economics of technological systems  | 4                    | exam                 |
| <b>The total amount of compulsory components:</b> |   | <b>34</b>            |                      |
| <b>The total amount of optional components</b>    |   | <b>34</b>            |                      |
| <b>3. OTHER TYPES OF TRAINING</b>                 |   |                      |                      |
| CC 8  | Practical trainings   | 16                   | exam                 |
| CC 9  | Preparation and defense of master's work  | 6                    | -                    |
| <b>THE TOTAL AMOUNT OF EPP</b>                    |   | <b>90</b>            |                      |

## Annotation of disciplines of the curriculum

### 1. GENERAL TRAINING CYCLE

#### Optional components EPP

*Optional subjects by Student's Choice*

**Applied computer technologies of machines for forestry.** The study of this discipline can improve applied theoretical and practical professional skills of future engineers through the study of newest computerized technologies of various technological systems; learning its functional potential and methods of use; obtain the necessary techniques and practical skills to work with applied computer programs.

**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, the stages of research, the organization of the experiment, the basis of the invention, in particular the issue of the application for the invention, as well as methods of statistical processing experimental data.

### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components EPP

**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 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.

**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.

**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

**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.

#### Optional components EPP

*Optional Block by choice of specialty*

**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.

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**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.

**Theory and designing of vehicles for forestry.** This discipline studies existed theoretical methods to develop and plan the constructional and technological parameters of vehicles for forestry.

**Testing of machines for forestry.** A course of this discipline is directed to study the engineering methods to tests the machines for forest complex. That allows obtaining an objective judgment about structural, technological, and operating characteristics of machines; to define its accordance to the requirements of specifications, tasks, requirements, and valid standards to working processes.

**Designing of technical systems for forestry (vibration action).** The discipline studies principles and methods of calculation and analytical description of vibration and motion at mechanical systems; general principles to design of machine with vibration; evaluation of their parameters, means to generate mechanical vibrations and pulses; and structural features of vibration machines for forestry.

**Economics of technological systems.** The economic aspects of making design decisions are considered in order to maximize the benefits. Practical classes in the discipline envisage students mastering the economic bases of production in the conditions of agro-industrial enterprises.

**Training of masters of sciences  
the field of knowledge "Mechanical Engineering"  
specialty 133 "SECTORAL ENGINEERING"  
for the educational program "TECHNICAL SERVICE OF MACHINES  
AND EQUIPMENT OF AGRICULTURAL COMPLEX"**

|  |                            |
|--|----------------------------|
| Type of studying:                                | Licensed persons:          |
| – full-time studying                             | 50                         |
| Duration of studying:                            |                            |
| – full-time educational and professional program | 1,5 years                  |
| Credits ECTS:                                    |                            |
| – educational and professional program           | 90                         |
| Language   | Ukrainian, English, German |
| Academic degree                                  | Engineer-Mechanic          |

**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 and professional training program**

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.

**Occupation 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.

### Examples of Master's Thesis Subjects

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 machines and equipment of agricultural complex" (educational and professional program of Master's training)

| Code n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper),<br>practice, qualification work) | Amount of<br>credits | The final<br>control |
|---|---|----------------------|----------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                  |   |                      |                      |
| <b>Optional components of EPP</b>                 |   |                      |                      |
| <i>Optional subjects by Student's Choice</i>      |   |                      |                      |
| OB 1  | Applied computer technologies   | 4                    | exam                 |
| OB 2  | Fundamentals of scientific research   | 4                    | exam                 |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>   |   |                      |                      |
| <b>Compulsory components of EPP</b>               |   |                      |                      |
| CC 1.   | Mechanics of constructions of technical systems of technical service  | 5                    | exam                 |
| CC 2.   | Systems of automated designing  | 5                    | exam, KP             |
| CC 3.   | Reliability of technical systems of technical service   | 4                    | exam                 |
| CC 4  | Energy-ecological assessment of the design of technical service   | 5                    | credit, exam         |
| CC 5  | Management and logistics of service enterprises   | 7                    | exam                 |
| CC 6  | Tests of equipment of technical service   | 4                    | exam                 |
| CC 7  | Qualimetry  | 4                    | exam                 |
| <b>Optional components EPP</b>                    |   |                      |                      |
| <i>Optional Block by choice of specialty</i>      |   |                      |                      |
| OB 1.1.   | Planning of technical service companies   | 9                    | exam, KP             |
| OB 1.2.   | Reliability of equipment of technical service   | 8                    | exam, KP             |
| OB 1.3.   | Methods of designing the equipment of the technical service   | 5                    | exam                 |
| OB 1.4.   | Economics of technological systems  | 4                    | exam                 |
| <b>The total amount of compulsory components:</b> |   | <b>34</b>            |                      |
| <b>The total amount of optional components</b>    |   | <b>34</b>            |                      |
| <b>3. OTHER TYPES OF TRAINING</b>                 |   |                      |                      |
| CC 8  | Practical trainings   | 16                   | exam                 |
| CC 9  | Preparation and defense of master's work  | 6                    | -                    |
| <b>THE TOTAL AMOUNT OF EPP</b>                    |   | <b>90</b>            |                      |



## Annotation of disciplines of the curriculum

### 1. GENERAL TRAINING CYCLE

#### Optional components EPP

*Optional subjects by Student's Choice*

**Applied computer technologies.** The study of this discipline can improve applied theoretical and practical professional skills of future engineers through the study of newest computerized technologies of various technological systems; learning its functional potential and methods of use; obtain the necessary techniques and practical skills to work with applied computer programs.

**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, the stages of research, the organization of the experiment, the basis of the invention, in particular the issue of the application for the invention, as well as methods of statistical processing experimental data.

### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components EPP

**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 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.

**Energy-ecological assessment of the design of technical service.** In this discipline are studied methods and methodics for calculating and designing at all stages of the development of technical facilities, schemes for the construction and operation of objects of modern new technology..

**Механіка конструкцій технічних систем ТС.** Дисципліна направлена на вивчення динамічних моделей конкретних машин та обладнання сільськогосподарської техніки, їхнього математичного опису, розрахунку діючих динамічних навантажень та рекомендацій щодо їхнього зменшення під час експлуатації.

**Mechanics of constructions of technical systems of technical service.** The discipline is aimed at studying the dynamic models of specific machines and equipment of agricultural machinery, their mathematical description, calculation of existing dynamic capacities and recommendations for their reduction during operation.

**Tests of equipment of technical service.** The course on this discipline is aimed at studying engineering methods of testing agricultural machinery, which allow obtaining an objective assessment of the structural, technological and operational properties of technology and determine their compliance with the technical tasks and operating technological requirements for work processes.

**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 examines the existing methods of calculations when conducting technical measurements

**Optional components EPP**

*Optional Block by choice of specialty*

**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.

**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.

**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 enterprise.

**Training of masters of sciences  
the field of knowledge "Architecture and Construction"  
specialty 192 "CONSTRUCTION AND CIVIL ENGINEERING"  
for the educational program "CONSTRUCTION AND CIVIL ENGINEERING"**

|  |                                     |
|--|-------------------------------------|
| Type of studying:                                | Licensed persons:                   |
| – full-time studying                             | 25                                  |
| Duration of studying                             |                                     |
| – full-time educational and professional program | 1,5 years                           |
| – full-time educational and research program     | 2 years                             |
| Credits ECTS:                                    |                                     |
| – educational and professional program           | 90                                  |
| – educational and 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.

**Occupation 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.

**Sphere 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:

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.

### Examples of Master's Thesis Subjects

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 n/a  | Components of the educational-professional program<br>(educational disciplines, course projects (paper), practice,<br>qualification work) | Amount of<br>credits | The final<br>control |
|---|---|----------------------|----------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                |   |                      |                      |
| <b>Optional components of EPP</b>               |   |                      |                      |
| <i>Optional subjects by Student's Choice</i>    |   |                      |                      |
| OB 1  | Theory and methodology of scientific research   | 4                    | exam                 |
| OB 2  | Estimate and contractual documentation  | 4                    | exam                 |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |   |                      |                      |
| <b>Compulsory components of EPP</b>             |   |                      |                      |
| CC 1.   | Modeling of buildings and structures  | 6                    | credit, KP           |
| CC 2.   | Reconstruction of buildings and structures  | 4                    | exam                 |
| CC 3.   | Basics of system analysis   | 5                    | exam                 |
| CC 4  | Mechatronic systems in construction   | 4                    | exam                 |

| Code n/a                                   | Components of the educational-professional program<br>(educational disciplines, course projects (paper), practice,<br>qualification work) | Amount of<br>credits | The final<br>control |
|--|---|----------------------|----------------------|
| CC 5                                       | Repair and maintenance of buildings and constructions   | 5                    | exam                 |
| CC 6                                       | Engineering protection and site preparation (BAF, MSW)  | 4                    | credit               |
| CC 7                                       | CAD in construction   | 5                    | exam                 |
| Optional components EPP                    |   |                      |                      |
| Optional Block by choice of specialty      |   |                      |                      |
| OB 1.1.                                    | Fundamentals of the theory of reliability and construction risks  | 6                    | exam                 |
| OB 1.2.                                    | Testing of building structures (BAF, LBC, MK)   | 6                    | exam                 |
| OB 1.3.                                    | Labor protection in the industry  | 4                    | exam                 |
| OB 1.4.                                    | Technology of erection of buildings and structures for<br>agricultural purposes   | 4                    | exam                 |
| OB 1.5.                                    | Volume and spatial solutions for buildings and structures   | 7                    | exam, credit,<br>KP  |
| The total amount of compulsory components: |   | 37                   |                      |
| The total amount of optional components    |   | 31                   |                      |
| 3. OTHER TYPES OF TRAINING                 |   |                      |                      |
| CC 8                                       | Production practice   | 16                   | credit               |
| CC 9                                       | Preparation and protection of master's work   | 6                    | exam                 |
| THE TOTAL AMOUNT OF EPP                    |   | 90                   |                      |

**Curriculum of Master training  
in educational program "Construction and civil engineering"  
(educational and research program of master's training)**

| <b>Code n/a</b>                                 | <b>Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work)</b> | <b>Amount of<br/>credits</b> | <b>The final<br/>control</b> |
|---|--|------------------------------|------------------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                |  |                              |                              |
| <b>Optional components of ERP</b>               |  |                              |                              |
| <i>Optional subjects by Student's Choice</i>    |  |                              |                              |
| OB 1  | Theory and methodology of scientific research  | 4                            | exam                         |
| OB 2  | Estimate and contractual documentation   | 4                            | exam                         |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                              |                              |
| <b>Compulsory components of ERP</b>             |  |                              |                              |
| CC 1.   | Modeling of buildings and structures   | 6                            | credit, KP                   |
| CC 2.   | Reconstruction of buildings and structures   | 4                            | exam                         |
| CC 3.   | Basics of system analysis  | 5                            | exam                         |
| CC 4  | Mechatronic systems in construction  | 4                            | exam                         |
| CC 5  | Repair and maintenance of buildings and constructions  | 5                            | exam                         |
| CC 6  | Engineering protection and site preparation (BAF, MSW)   | 4                            | credit                       |
| CC 7  | CAD in construction  | 5                            | exam                         |
| CC 8.   | Dynamics and stability of buildings and structures   | 6                            | exam                         |
| CC 9.   | Diagnosis of the technical condition of buildings and structures   | 7                            | exam                         |
| CC 10.  | Engineering research in construction   | 7                            | exam                         |
| <b>Optional components ERP</b>                  |  |                              |                              |
| <i>Optional Block by choice of specialty</i>    |  |                              |                              |
| OB 1.1.   | Fundamentals of the theory of reliability and construction risks   | 6                            | exam                         |
| OB 1.2.   | Testing of building structures (BAF, LBC, MK)  | 6                            | exam                         |
| OB 1.3.   | Labor protection in the industry   | 4                            | exam                         |
| OB 1.4.   | Technology of erection of buildings and structures for agricultural purposes   | 4                            | exam                         |
| OB 1.5.   | Volume and spatial solutions for buildings and structures  | 7                            | exam, credit, KP             |

| Code n/a  | Components of the educational-professional program (educational disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|---|---|-------------------|-------------------|
| OB 1.6.   | Energy efficiency of buildings and structures   | 5                 | exam              |
| OB 1.7.   | Ecological building materials and technologies  | 5                 | exam              |
| <b>The total amount of compulsory components:</b> |   | <b>57</b>         |                   |
| <b>The total amount of optional components</b>    |   | <b>41</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                 |   |                   |                   |
| CC 11   | Production practice   | 16                | credit            |
| CC 12   | Preparation and protection of master's work   | 6                 | exam              |
| <b>THE TOTAL AMOUNT OF ERP</b>                    |   | <b>120</b>        |                   |

### Annotation of disciplines of the curriculum

#### 1. GENERAL TRAINING CYCLE

##### Optional components EP

##### *Optional subjects by Student's Choice*

**Theory and methodology of scientific research.** Increasing the general theoretical and practical engineering level of future masters-builders by mastering the foundations of theoretical knowledge and practical skills on the general concepts of experimental research methods.

**Estimated and contractual documentation.** Formation of knowledge of students about the selection of effective methods and techniques: feasibility study of the reconstruction of buildings and structures; estimated documentation and pricing during reconstruction; business plan for project implementation; formation of general plans.

#### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

##### Compulsory components EP

**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.

**Mechatronic systems in construction.** Teaching of theoretical foundations and principles of construction of mechatronic systems in construction. Theoretical foundations of the construction of mechatronic systems, methods of their management, and automatic means for the implementation of mechatronic systems in agricultural construction.

**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.

**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.

### **Optional components EPP**

#### *Optional Block by choice of specialty*

**Volume and spatial solutions for buildings and structures.** Theoretical bases of teaching of theoretical bases and principles of development of effective building designs methods of their control and automatic means of realization of systems in agricultural construction.

**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.

**Fundamentals of the theory of reliability and construction risks.** To give knowledge about the legal, organizational and methodological foundations of the theory of reliability of houses and risks of innovative engineering technologies in agricultural construction.

**Technology of buildings and construction erection for agricultural purpose.** 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.

**Occupational health.** Acquiring skills to develop innovative organizational measures to prevent accidents, injuries and morbidity in the construction industry.

**Repair and operation of buildings and structures.** The theoretical basis for the repair and operation of structures of agricultural purpose.

### **Optional components ERP**

#### *Optional Block by choice of specialty*

**Volume and spatial solutions for buildings and structures.** Theoretical bases of teaching of theoretical bases and principles of development of effective building designs methods of their control and automatic means of realization of systems in agricultural construction.

**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.

**Fundamentals of the theory of reliability and construction risks.** To give knowledge about the legal, organizational and methodological foundations of the theory of reliability of houses and risks of innovative engineering technologies in agricultural construction.

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**Technology of buildings and construction erection for agricultural purpose.**

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.

**Occupational health.** Acquiring skills to develop innovative organizational measures to prevent accidents, injuries and morbidity in the construction industry.

**Repair and operation of buildings and structures.** The theoretical basis for the repair and operation of structures of agricultural purpose.

**Dynamics and stability of buildings and structures.** Provides the basis for dynamic calculation of buildings and structures for sustainability.

**Diagnosis of the technical condition of buildings and structures.** The discipline studies the main causes of damage to buildings and structures, equipment and methods of inspections and determination of the technical condition of construction sites.

**Engineering research in construction.** Provides theoretical and practical knowledge of engineering construction training.

**Energy efficiency of buildings and structures.** Introduces future builders to the elements of energy efficiency of buildings and structures.

**Ecological building materials and technologies.** Modern traditional and alternative building materials and technologies and their impact on the environment and man are studied.

## **FACULTY OF MECHANICS-TECHNOLOGY**

**Dean** – Associate Professor Yaroslav Mykhalovich

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 educational programs within specialties:

### **Specialty 208 "Agricultural Engineering"**

#### ***Educational program "Agricultural Engineering"***

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

Guarantor of the educational and research program - Doctor of Technical Science, Professor Hennadii A. Holub.

Departments in charge of graduate training:

#### **Mechanization of livestock**

Tel.: (044) 527-85-35

E-mail: mechaniz\_chair@twin.nauu.kiev.ua

Head – Ph.D., Associate Professor Vasyl S. Khmelyovskiy

#### **Technical service and engineering management of them M.P. Momotenka**

Tel.: (044) 527-88-53

E-mail: vdv-tsim@ukr.net

Head – Doctor of Technical Science, Professor Valeriy D. Voytyuk

#### **Occupational Health and environment engineering**

Tel.: (044) 527-82-99

E-mail: voynaiov@bigmir.net

Head – Ph.D., associate professor Alexander V. Voinalovych

#### **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 biological energy system**

Tel.: (044) 527-88-95

E-mail: vvchuba@ukr.net

Head – PhD, Associate Professor Vyacheslav V. Chuba

**Specialty 274 “Motor transport”**

***Educational program "Motor 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: [ttnubip@ukr.net](mailto:ttnubip@ukr.net)

Head – Doctor of Technical Science, Associate Professor Vyacheslav V. Bratishko

**Tractors, cars and biological energy system**

Tel.: (044) 527-88-95

E-mail: [vvchuba@ukr.net](mailto:vvchuba@ukr.net)

Head - PhD, Associate Professor Vyacheslav V. Chuba

**Technical service and engineering management of them. M.P. Momotenka**

Tel.: (044) 527-88-53

E-mail: [vdv-tsim@ukr.net](mailto:vdv-tsim@ukr.net)

Head – Doctor of Technical Science, Professor Valeriy D. Voytyuk

**Specialty 275 “Transport Technologies”**

**Specialization 275.03 “Transport Technologies (Motor transport)”**

***Educational program "Transport Technologies on Motor 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: [ttnubip@ukr.net](mailto:ttnubip@ukr.net)

Head – Doctor of Technical Science, Associate Professor Vyacheslav V. Bratishko

**Tractors, cars and biological energy system**

Tel.: (044) 527-88-95

E-mail: [vvchuba@ukr.net](mailto:vvchuba@ukr.net)

Head – PhD, Associate Professor Vyacheslav V. Chuba

**Technical service and engineering management of them. MP Momotenka**

Tel.: (044) 527-88-53

E-mail: [vdv-tsim@ukr.net](mailto:vdv-tsim@ukr.net)

Head – Doctor of Technical Science, Professor Valeriy D. Voytyuk

**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 persons                 |
| – Part-time                                      | 125 persons                 |
| Duration of training:                            |                             |
| – Full-time educational and professional program | 1,5 years                   |
| – Full-time educational and research program     | 2 years                     |
| – Part -time                                     | 1,5 years                   |
| 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.

***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.



### Proposed Topics for Master 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>1. 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>Optional components of EPP</b>                                      |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>                           |  |                   |                   |
| OB 1   | Optional subject 1   | 4                 | exam              |
| OB 2   | Optional subject 2   | 4                 | exam              |
| <b>2. 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              |
| <b>Optional components of EPP</b>                                      |  |                   |                   |
| <i>Optional Block by specialty</i>                                     |  |                   |                   |
| <i>Optional Block 1 "Technology and machinery in crop production"</i>  |  |                   |                   |
| OB 1.1   | Design and calculation systems in crop   | 4                 | exam              |
| OB 1.2   | Designing processes in plant   | 4                 | exam              |
| OB 1.3   | Process control in crop  | 4                 | exam              |
| OB 1.4   | Innovative engineering technologies  | 4                 | exam              |
| <i>Optional Block 2 "Technology and machinery in animal husbandry"</i> |  |                   |                   |
| OB 2.1   | Design and calculation of technological systems in animal husbandry  | 4                 | exam              |
| OB 2.2   | Designing processes in livestock   | 4                 | exam              |
| OB 2.3   | Process control in livestock   | 4                 | exam              |
| OB 2.4   | Ecological security processes  | 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 "Optimization of parameters, processes and operating modes of the APC"</i> |  |                   |                    |
| OB 3.1   | Designing processes and modes of technology APC  | 4                 | exam               |
| OB 3.2   | Modeling business processes and machines   | 4                 | exam               |
| OB 3.3   | Testing of agriculture technology  | 4                 | exam               |
| OB 3.4   | Logistics in mechanization of agriculture  | 4                 | exam               |
| <b>The total amount of compulsory components</b>   |  | <b>36</b>         |                    |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                    |
| <b>3. OTHER TYPES OF TRAINING</b>  |  |                   |                    |
| CC 9   | Internship   | 21                | test               |
| CC 10  | Preparation and defense of master's work   | 9                 | Protection of work |
| <b>THE TOTAL AMOUNT OF EPP</b>   |  | <b>90</b>         |                    |

### Annotations of subjects in the curriculum

#### 1. 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.

#### 2. 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**

#### *Optional Block by 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.

#### *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

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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  |
|---|--|-------------------|--------------------|
| 1. GENERAL TRAINING CYCLE                 |  |                   |                    |
| Compulsory components of ERP              |  |                   |                    |
| CC 1                                      | Legislation and Law in agriculture   | 5                 | exam               |
| CC 2                                      | Methodology of scientific research   | 4                 | exam               |
| CC 3                                      | Agrarian Policy  | 3                 | exam               |
| CC 4                                      | Economy of technological systems   | 4                 | exam               |
| CC 5                                      | Business Foreign Language  | 5                 | exam               |
| Optional components of ERP                |  |                   |                    |
| Optional subjects by Student's Choice     |  |                   |                    |
| OB 1                                      | Optional subject 1   | 4                 | exam               |
| OB 2                                      | Optional subject 2   | 4                 | exam               |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE  |  |                   |                    |
| Compulsory components of ERP              |  |                   |                    |
| 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                                     | Industrial sanitation  | 4                 | exam               |
| CC 14                                     | Measuring instruments and measurement methods  | 4                 | exam               |
| CC 15                                     | Testing of agricultural machinery  | 4                 | exam               |
| Optional components of ERP                |  |                   |                    |
| Optional Block by specialty               |  |                   |                    |
| OB 1.1                                    | Design of biotechnological processes   | 4                 | exam               |
| OB 1.2                                    | Bioenergy systems in agricultural production   | 4                 | exam               |
| OB 1.3                                    | The system is a man-machine-animal   | 4                 | exam               |
| OB 1.4                                    | Mechanization of the processes of composting   | 4                 | exam               |
| The total amount of compulsory components |  | 66                |                    |
| The total amount of optional components   |  | 24                |                    |
| 3. OTHER TYPES OF TRAINING                |  |                   |                    |
| CC 16                                     | Internship   | 21                | test               |
| CC 17                                     | Preparation and defense of master's work   | 9                 | Protection of work |
| THE TOTAL AMOUNT OF ERP                   |  | 120               |                    |

## Annotations of disciplines in the curriculum

### 1. GENERAL TRAINING CYCLE

#### Compulsory components of ERP

**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.

**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.

**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.

### 2. 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**

#### *Optional Block by specialty*

**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.

**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.



**Training of masters of sciences  
branch of knowledge 27 "Transport"  
in specialty 274 "MOTOR TRANSPORT"  
educational program "MOTOR TRANSPORT"**

|  |                             |
|--|-----------------------------|
| Form of Training:                                | Licensed number of persons: |
| – Full-time                                      | 50                          |
| Duration of training                             |                             |
| – Full-time educational and professional program | 1,5 years                   |
| Credits ECTS:                                    |                             |
| – educational and professional program           | 90                          |
| Language of training                             | Ukrainian, English, German  |
| Qualification of graduates:                      | Master in Motor 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 "Raihrohtekhservis"; 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 for Master Theses**

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.
-

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 "Motor 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  |
|---|--|-------------------|--------------------|
| 1. GENERAL TRAINING CYCLE                 |  |                   |                    |
| Compulsory components of EPP              |  |                   |                    |
| CC 1                                      | Applied Computer Technologies in Automobile Transport  | 4                 | exam               |
| CC 2                                      | Environmental safety of vehicles Complete  | 6                 | exam               |
| CC 3                                      | Economy of motor transport   | 4                 | exam               |
| Optional components of EPP                |  |                   |                    |
| Optional subjects by Student's Choice     |  |                   |                    |
| OB 1                                      | Optional subject 1   | 4                 | exam               |
| OB 2                                      | Optional subject 2   | 4                 | exam               |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE  |  |                   |                    |
| Compulsory components of EPP              |  |                   |                    |
| CC 4                                      | Tests of cars and engines  | 4                 | exam               |
| CC 5                                      | Operational properties of cars   | 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               |
| Optional components of EPP                |  |                   |                    |
| Optional Block by specialty               |  |                   |                    |
| OB 1.1                                    | Transport technologies in agrarian production  | 4                 | exam               |
| OB 1.2                                    | Methodology and organization of scientific research on the basics of intellectual property                           | 4                 | exam               |
| OB 1.3                                    | Organization and safety of motor transport   | 4                 | exam               |
| OB 1.4                                    | Scientific basis of technical operation of machines  | 4                 | exam               |
| The total amount of compulsory components |  | 36                |                    |
| The total amount of optional components   |  | 24                |                    |
| 3. OTHER TYPES OF TRAINING                |  |                   |                    |
| CC 9                                      | Internship   | 21                | test               |
| CC 10                                     | Preparation and defense of master's work   | 9                 | Protection of work |
| THE TOTAL AMOUNT OF EPP                   |  | 90                |                    |

**Annotations of subjects in the curriculum**

**1. 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.

**Environmental safety of vehicles.** 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.

## 2. 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 use of technology, 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

#### *Optional Block by specialty*

**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.

**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.

**Training of masters of sciences  
in branch of knowledge "Transport"  
in specialty 275 "TRANSPORT TECHNOLOGIES"  
specialization 275.03 "TRANSPORT TECHNOLOGIES (MOTOR TRANSPORT)"  
educational program "TRANSPORT TECHNOLOGIES  
ON MOTOR TRANSPORT"**

|  |  |
|--|--|
| Form of Training:                                | Licensed number of persons:            |
| – Full-time                                      | 30                                     |
| – Part-time                                      | 30                                     |
| Duration of training                             |  |
| – Full-time educational and professional program | 1,5 years                              |
| – Part-time                                      | 1,5 years                              |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90                                     |
| Language of training                             | Ukrainian, English                     |
| Qualification of graduates:                      | Master in Transportation<br>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 for Master Theses**

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.
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 on Motor 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  |
|---|--|-------------------|--------------------|
| 1. GENERAL TRAINING CYCLE                 |  |                   |                    |
| Compulsory components of EPP              |  |                   |                    |
| CC 1                                      | Information Technology in transport  | 4                 | exam               |
| CC 2                                      | Transport Economics  | 4                 | exam               |
| CC 3                                      | Occupational Health  | 6                 | exam               |
| Optional components of EPP                |  |                   |                    |
| Optional subjects by Student's Choice     |  |                   |                    |
| OB 1                                      | Optional subject 1   | 4                 | exam               |
| OB 2                                      | Optional subject 2   | 4                 | exam               |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE  |  |                   |                    |
| Compulsory components of EPP              |  |                   |                    |
| CC 4                                      | Loads agriculture  | 4                 | exam               |
| CC 5                                      | Supply chain management  | 4                 | exam               |
| CC 6                                      | Quality Management Technology  | 4                 | exam               |
| CC 7                                      | Testing and certification of vehicles  | 4                 | exam               |
| CC 8                                      | Freight forwarding activity  | 6                 | exam               |
| Optional components of EPP                |  |                   |                    |
| Optional Block by specialty               |  |                   |                    |
| OB 1.1                                    | Roads of internal economic purpose   | 4                 | exam               |
| OB 1.2                                    | Methodology of scientific research   | 4                 | exam               |
| OB 1.3                                    | Recycling vehicles   | 4                 | exam               |
| OB 1.4                                    | Technical service vehicles   | 4                 | exam               |
| The total amount of compulsory components |  | 36                |                    |
| The total amount of optional components   |  | 24                |                    |
| 3. OTHER TYPES OF TRAINING                |  |                   |                    |
| CC 9                                      | Internship   | 21                | test               |
| CC 10                                     | Preparation and defense of master's work   | 9                 | Protection of work |
| THE TOTAL AMOUNT OF EPP                   |  | 90                |                    |

## Annotations of subjects in the curriculum

### 1. GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Information Technology in transport.** Obtaining knowledge and skills aimed at creating and using road transport navigation subsystems, parts and systems of vehicles. Learning the basics of analysis and synthesis of information navigation systems on vehicles with a computer system at various levels and purposes.

**Transport Economics** Is to explore relations in the middle of technological systems, skills planning, pricing and investment, determine the efficiency of traffic organization and management in motor manufacturing.

**Occupational Health.** Acquiring the skills to develop innovative organizational measures to prevent accidents, injuries and illness in the organization of transportations and management on motor manufacture.

### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components of EPP

**Loads agriculture.** Disclosure of development and methods of using the full set of rules potential vehicles for the transport of specific characteristics of agriculture and natural production conditions, determine the need for these funds to achieve programmed outcomes and compliance.

**Supply chain management.** Mastering the theoretical foundations of supply chain management; review of key business processes in the supply chain; acquiring skills design and planning supply chains; learning the basics of creating a single information space participants of the supply chain; familiarization with the criteria of quality and efficiency of supply chains.

**Quality management technology.** Getting knowledge corresponding to the current level in quality management vehicles, review of major developments in the theory and practice of quality management in different countries, the need to use advances in quality management, its organizational system, the need to switch to production management product "because of the quality" of using international standards ISO 9000, adopted in Ukraine as national.

**Testing and certification of vehicles.** Examines legislation concerning the system of testing and certification of vehicles, specific features of their use in agricultural production, technology and the test conditions for certification and issuing of certificates certifying quality of production vehicles.

**Freight forwarding activity.** Formation of system knowledge and practical skills of forwarding activities by type and forms, especially the processes of forwarding service. In accordance with the methods of freight forwarding service, determine the parameters of forwarding services; perspective directions of further development of forwarding services and determine its effectiveness.

#### Optional components of EPP

##### *Optional Block by specialty*

**Roads farm purposes.** Acquiring the skills to develop innovative arrangements for operational efficiency and road design farm supplies, prevention of accidents, injuries and illness in the organization of transportations and management on motor manufacture.

**Methodology of scientific research.** Raising general theoretical and practical engineering of future masters-Transport by mastering the basics of theoretical knowledge and practical skills on the general concept of experimental research methods of organization and management of transportation in motor manufacturing.

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**Recycling vehicles.** Disclosure retsyklinhovyh design methodology of different levels, the concept of recycling mechanism organizational coordination, forms of cooperation organizations; able: to draft retsyklinhovoyi system, analyze retsyklinhove environment, paint algorithm "problem" formation retsyklinhovyh systems, develop organizational structure retsyklinhovoyi system, allocate and analyze business processes organizations use to optimize the principles recycling system.

**Technical service vehicles.** Providing knowledge on methods and means of promoting technical condition of the car, its units, systems and mechanisms, maintenance organizations and maintenance vehicles.

**EDUCATION AND RESEARCH INSTITUTE  
OF ENERGETICS, AUTOMATICS AND ENERGY SAVING**

**Director** – Doctor of Technical Sciences, Professor Victor Kaplun  
Tel.: (044) 527-85-80  
E-mail: epafort1@ukr.net  
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, Associate Professor, Andrei Zhylytsov.

Guarantor of the educational and research program - Doctor of Technical Sciences, Associate Professor, Leonid Chervinsky

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

**Department of Electrical engineering, electromechanics and electrotechnology**

Tel.: (044) 527-87-55; (044) 527-87-89

E-mail: elmash\_nubip@ukr.net

Head of department – Doctor of Technical Sciences, Associate Professor Andrei Zhylytsov

**Department of Power Supply named after Prof. V.M. Synkov**

Tel.: (044) 527-85-80

E-mail: epafort1@ukr.net

Head of department – Candidate of Technical Sciences, Associate Svitlana Makarevych

**Department of Heat and Power Engineering**

Tel.: (044) 527-87-48

E-mail: gorobetsv@ukr.net

Head of department – Doctor of Technical Sciences, Professor Professor Valery Gorobets

**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, Associate Professor, Vitaly Lysenko.

Guarantor of the educational and research program - Doctor of Technical Sciences, Associate 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

**Training of masters of sciences  
field of knowledge "Electrical Engineering"  
in specialty 141 "POWER ENGINEERING, ELECTRICAL ENGINEERING AND  
ELECTRICAL MECHANICS"  
in 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 | 1,5 years  |
| – Full-time educational and research program     | 2 years  |
| – Part-time                                      | 1,5 years  |
| Credits:   |  |
| – educational and professional program           | 90   |
| – educational and research program               | 120  |
| Language   | Ukrainian  |
| Qualification of graduates:                      | Master of power engineering,<br>electrical engineering and electrical<br>mechanics |

**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 Energetics, 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 "Automation of technological processes and computer integrated systems to control information and technological resources in agriculture"***

Research, development and implementation of computer-integrated control systems of information and technological resources in agriculture technology and mathematical modeling. Information technology resources of automated control systems and technological resources for agriculture.

**Areas of employment for graduates**

Engineer in automated control systems, engineer in automation and computer-integrated technologies, engineer in maintenance of automation systems for enterprise.

***Optional Block "Electrical networks and systems"***

Design, installation, commissioning and operation of transmission lines, transformer substations and switchgears. Accounting and management of electrical energy. Power plants, modeling and design of power APC. Modeling and automation of security devices and power supply systems.

**Areas of employment for graduates**

Production, distribution and use of electricity, electrical work, repair and maintenance of power lines, transformer substations and electricity equipment.

***Optional Block "Power Supply"***

Installation and operation of power plants in agriculture, development and implementation of alternative and renewable energy sources. Thermal power plants and systems, alternative and renewable energy for agriculture. Energy sources and heating technologies.

**Areas of employment for graduates**

Electricity production from renewable sources. Production and distribution of heat. Collection, purification and distribution of water.

***Optional Block "Scientific and technical principles of electromechanical energy conversion"***

Transformation of electrical energy, the development of new drives with improved performance properties. Reliability of technical systems and quality of energy resources and energy resources. Energy engineering technologies and operational reliability of electrical equipment.

**Areas of employment for graduates**

Repair and maintenance of transmission lines, transformer substations and electricity equipment. Installation works. Design work.

***Optional Block "Electrotechnical systems of power consumption"***

Research, development and introduction of energy saving technologies, electrical networks and systems. Power plants, modeling and design of power supply in Agriculture. Modeling and protection devices and automation of power supply systems.

**Areas of employment for graduates**

Production, distribution and use of electricity, electrical work, repair and maintenance of power lines, transformer substations and electricity equipment.

***Optional Block "Electrotechnics and electrotechnology"***

Research, development and introduction of modern technologies of electrified farms in the production and processing of agricultural products. Simulation of controlled electric actuators in livestock. Design of electrical power and lighting systems and networks in livestock. Modeling of controlled electric actuators in the seed and seedling. Design of electrical power and lighting systems and networks in the seed and seedling.

**Areas of employment for graduates**

Electrotechnology of agroindustrial complex. Repair, maintenance and operation of electrical equipment in animal husbandry and plant growing. Installation works. Design works.

***Optional Block "Light engineering and light sources"***

Research, development and introduction of modern lighting technologies in farms for the production and processing of agricultural products. Modeling of lighting installations. Designing lighting systems in animal husbandry. Design of lighting systems and networks in seed and seedling.

**Areas of employment for graduates**

Electrotechnology of agroindustrial complex. Repair, maintenance and operation of electrical equipment in animal husbandry and plant growing. Installation works. Design works.

***Optional Block "Energy audit"***

Checking and researching energy flows to conserve energy in a building, process or system and reduce the amount of energy entering the system without adversely affecting its leakage. Designing of energy saving systems.

**Areas of employment for graduates**

Repair, maintenance and maintenance of buildings for energy conservation purposes. Work on implementation of energy saving systems. Design work.

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

***Optional Block "Energy efficient control 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

***Optional Block "Electrical stations, networks and systems"***

Design, installation, commissioning and operation of transmission lines, transformer substations and switchgears. Accounting and management of electrical energy. Power plants, modeling and design of power APC. Modeling and automation of security devices and power supply systems.

**Areas of employment for graduates**

Engineer-researcher research institutions, research associate research institutions. Operating engineer of electric networks and systems.

***Optional Block "Power Supply"***

Installation and operation of power plants in agriculture, development and implementation of alternative and renewable energy sources. Thermal power plants and systems, alternative and renewable energy for agriculture. Energy sources and heating technologies.

**Areas of employment for graduates**

Engineer-researcher of research institutions, scientific assistant of research institutions.

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***Optional Block "Scientific and technical principles of electromechanical energy conversion"***

Studying ways to convert electrical energy, development of new drives with improved performance properties. Basic principles of research and the modern theory of electromechanical energy conversion. Technology research of electromagnetic and electromechanical devices, power converters.

**Areas of employment for graduates**

Engineer-researcher of research institutions, scientist of research and design estimates institutions.

***Optional Block "Electrotechnical systems of power consumption"***

Design, installation, commissioning and maintenance of power lines, transformer substations and switchgear. Accounting and rational use of electricity. Power plants, modeling and design of power supply in Agriculture. Modeling and protection devices and automation of power supply systems.

**Areas of employment for graduates**

Engineer-researcher of scientific institutions, research associate of scientific institutions. Operating engineer of electric networks and systems.

***Optional Block "Electrotechnics and electrotechnology"***

Research the efficiency improving methods of agricultural production using the new electrified technologies. Modeling of controlled electric drives and actuators in agriculture. Methods of processing quality products in agriculture.

**Areas of employment for graduates**

Engineer of electrified technology, research engineer of research institutions, scientific employee of research institutions.

***Optional Block "Light engineering and light sources"***

Research, development and introduction of modern lighting technologies in farms for the production and processing of agricultural products. Modeling of lighting installations. Designing lighting systems in animal husbandry. Design of lighting systems and networks in seed and seedling.

**Areas of employment of graduates**

Engineer in electrified technology and lighting, research engineer research institution, research worker of research institutions.

***Optional Block "Energy and automation of biosystems"***

Research and development of the latest energy installations in agriculture. Research, development and implementation of non-traditional and renewable energy sources, automated process control systems.

**Areas of employment of graduates**

Engineer-researcher of research institutions, repair, maintenance and operation of buildings for energy saving purposes. Works on introduction of energy saving systems. Project work.

### 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 "Kyivsilelectro", regional electricity networks.

### Proposed Topics for Master's Thesis

1. Optimization of parameters and operating modes of power grid;
2. The influence of autonomous power supply into the quality and reliability of power supply in agricultural enterprise.
3. Automated system of accounting and regulation of the energy resources and energy.
4. Power supply of livestock farms from renewable energy sources.
5. Energy Service Project agricultural enterprise.
6. The system energy management of agricultural enterprises.
7. Computer-integrated SAR packaging dairy products.
8. Intelligent automated control system.
9. Automated Control System based on neuronetworks.
10. Integrated using of traditional and alternative energy sources.
11. Optimization of parameters and operating modes of power grid.
12. The impact of autonomous power sources on the quality and reliability of power supply in agricultural sector.
13. Automated system of accounting and regulation of the energy resources and energy.
14. Power supply of livestock farms from renewable energy sources.
15. Electrification processes in the processing of animal products.
16. Electrification processes in the food industry.
17. Electrification processes in the processing plant production.
18. Automated system of accounting and regulation of the energy resources and energy.
19. Computer-integrated control system of packaging dairy products.
20. Intelligent automated control system of technological processes.
21. Automated control system with neuro information networks.
22. Assessment of quality agricultural products by visual discharge electrography.
23. Magnetic treatment of water and nutrient fuel solvent in greenhouses.
24. Research of ultraviolet radiation on animals.

### Curriculum of Master's 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>1. GENERAL TRAINING CYCLE</b>    |  |                   |                   |
| <b>Compulsory components of EPP</b> |  |                   |                   |
| CC 1                                | Safety in Electrical Installations   | 3                 | exam              |
| CC 2                                | Electromagnetic Compatibility  | 3                 | 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 3  | Information Technology  | 3                        | exam                     |
| CC 4  | Methodology and Organization of Scientific Research on the Basics of Intellectual Property                                  | 3                        | exam                     |
| CC 5  | Agricultural Policy   | 3                        | exam                     |
| CC 6  | Business Foreign Language   | 3                        | exam                     |
| <b>Optional components of EPP</b>   |   |                          |                          |
| <i>Optional subjects by Student's Choice</i>  |   |                          |                          |
| OB 1  | Optional subject 1  | 4                        | exam                     |
| OB 2  | Optional subject 2  | 4                        | exam                     |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>   |   |                          |                          |
| <b>Compulsory components of EPP</b>   |   |                          |                          |
| CC 7  | Energy Security   | 4                        | exam                     |
| CC 8  | Mathematical Modeling of Electrotechnical Systems and Their Components  | 4                        | exam                     |
| CC 9  | Basics of Energy Saving   | 4                        | exam                     |
| CC 10   | Methods of Synthesis and Analysis of ACS  | 4                        | exam                     |
| CC 11   | Optimization Theory   | 4                        | exam                     |
| CC 12   | Energy Supply   | 4                        | exam                     |
| CC 13   | Design of electrification, automation and power supply systems  | 4                        | exam                     |
| CC 14   | Heat and Water Supply   | 4                        | exam                     |
| CC 15   | Technology of Maintenance and Repair of Electrical Equipment and Means of Automation  | 4                        | exam                     |
| <b>Optional components of EPP</b>   |   |                          |                          |
| <i>Optional Block by specialty</i>  |   |                          |                          |
| <i>Optional Block 1 "Automation of technological processes and computer integrated systems to control information and technological resources in agriculture"</i> |   |                          |                          |
| OB 1.1  | Automation systems in power engineering   | 4                        | exam                     |
| OB 1.2  | Methods of modern control of technological processes and production in energy   | 4                        | exam                     |
| OB 1.3  | Hardware and hardware of control systems in power engineering   | 4                        | exam                     |
| OB 1.4  | Typical technological processes in energy and methods of their modeling   | 4                        | exam                     |
| <i>Optional Block 2 "Electrical networks and systems"</i>   |   |                          |                          |
| OB 2.1  | Automatics and Telemechanics of Power Supply Systems  | 4                        | exam                     |
| OB 2.2  | Electrical Networks and Systems   | 4                        | exam                     |
| OB 2.3  | Electrical Plants and Systems of Energy Supply.   | 4                        | exam                     |
| OB 2.4  | Design of Power Supply Systems  | 4                        | exam                     |
| <i>Optional Block 3 "Energy Supply"</i>   |   |                          |                          |
| OB 3.1  | Energy Saving in Heating Technologies   | 4                        | exam                     |
| OB 3.2  | Account and Regulation of Energy Distribution and Costs   | 4                        | exam                     |
| OB 3.3  | Heat and Energy Installations and Systems   | 4                        | exam                     |
| OB 3.4  | Heating Technologies of Production and Processing of Agricultural Product   | 4                        | exam                     |
| <i>Optional Block 4 "Scientific and technical principles of electromechanical energy conversion"</i>  |   |                          |                          |
| OB 4.1  | Reliability of Technical Systems and Technogenic Risks  | 4                        | exam                     |
| OB 4.2  | Accounting and Regulation of Energy Resources Costs   | 4                        | exam                     |
| OB 4.3  | Software of Physical Researches   | 4                        | exam                     |
| OB 4.4  | Technical Service of Power Equipment  | 4                        | exam                     |
| <i>Optional Block 5 "Electrotechnical systems of power consumption"</i>   |   |                          |                          |
| OB 5.1  | Renewable Sources of Electric Energy Generation   | 4                        | exam                     |
| OB 5.2  | Design of Power Consumption Systems   | 4                        | exam                     |
| OB 5.3  | Relay Protection and Automation of Distribution Power Networks  | 4                        | exam                     |
| OB 5.4  | Telemechanics and ACS of Power Supply Systems   | 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 |
|--|--|-------------------|-------------------|
| <i>Optional Block 6 "Electrotechnics and electrotechnology"</i>  |  |                   |                   |
| OB 6.1   | Electrotechnology Processing of Agricultural Products  | 4                 | exam              |
| OB 6.2   | Modeling of Adjustable Electric Drives, Aggregates and Production Lines  | 4                 | exam              |
| OB 6.3   | Fundamentals of energy efficiency of consumer grids  | 4                 | exam              |
| OB 6.4   | Fundamentals of bioenergy technologies   | 4                 | exam              |
| <i>Optional Block 7 "Lighting engineering and light sources"</i> |  |                   |                   |
| OB 7.1   | Laser Technics   | 4                 | exam              |
| OB 7.2   | Design, Installation and Operation of Lighting Installations   | 4                 | exam              |
| OB 7.3   | Lighting Installations and Systems   | 4                 | exam              |
| OB 7.4   | Physical Bases of Light Sources and Energy Saving in Lighting Installations  | 4                 | exam              |
| <i>Optional Block 8 "Energy audit"</i>                           |  |                   |                   |
| OB 8.1   | Design solutions for energy management   | 4                 | exam              |
| OB 8.2   | Accounting and management of energy consumption  | 4                 | exam              |
| OB 8.3   | Energy audit and management in agriculture   | 4                 | exam              |
| OB 8.4   | Energy management and project management   | 4                 | exam              |
| <b>The total amount of compulsory components</b>                 |  | <b>54</b>         |                   |
| <b>The total amount of optional components</b>                   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                                |  |                   |                   |
| CC 16  | Practical Training   | 8                 |                   |
| CC 17  | State certification  | 4                 |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                                   |  | <b>90</b>         |                   |

**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 (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|---|--|-------------------|-------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of ERP</b>             |  |                   |                   |
| CC 1  | Safety in Electrical Installations   | 3                 | exam              |
| CC 2  | Electromagnetic Compatibility  | 3                 | exam              |
| CC 3  | Information Technology   | 3                 | exam              |
| CC 4  | Methodology and Organization of Scientific Research on the Basics of Intellectual Property                           | 3                 | exam              |
| CC 5  | Agricultural Policy  | 3                 | exam              |
| CC 6  | Business Foreign Language  | 3                 | exam              |
| <b>Optional components of ERP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 4                 | exam              |
| OB 2  | Optional subject 2   | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of ERP</b>             |  |                   |                   |
| CC 7  | Energy Security  | 4                 | exam              |
| CC 8  | Mathematical Modeling of Electrotechnical Systems and Their Components   | 4                 | exam              |
| CC 9  | Basics of Energy Saving  | 4                 | exam              |
| CC 10   | Methods of Synthesis and Analysis of ACS   | 4                 | exam              |
| CC 11   | Optimization Theory  | 4                 | exam              |
| CC 12   | Energy Supply  | 4                 | exam              |
| CC 13   | Design of electrification, automation and power supply   | 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> |
|--|---|--------------------------|--------------------------|
|  | systems   |                          |                          |
| CC 14  | Heat and Water Supply   | 4                        | exam                     |
| CC 15  | Technology of Maintenance and Repair of Electrical Equipment and Means of Automation  | 4                        | exam                     |
| <b>Optional components of ERP</b>  |   |                          |                          |
| <i>Optional Block by specialty</i>   |   |                          |                          |
| <i>Optional Block 1 "Energy Efficient Control Systems of Biotechnological Objects"</i>               |   |                          |                          |
| OB 1.1   | Automation systems in power engineering   | 4                        | exam                     |
| OB 1.2   | Methods of modern control of technological processes and production in energy   | 4                        | exam                     |
| OB 1.3   | Hardware and hardware of control systems in power engineering   | 4                        | exam                     |
| OB 1.4   | Typical technological processes in energy and methods of their modeling   | 4                        | exam                     |
| OB 1.5   | Biotechnological Objects of Automation, Methods of Their Research and Modeling  | 7                        | exam                     |
| OB 1.6   | Information Technology in Control Systems   | 5                        | exam                     |
| OB 1.7   | Computer Integrated Control Systems in Agriculture  | 7                        | exam                     |
| OB 1.8   | Modern Methods of Developing Automation Systems for Biotechnological Objects  | 6                        | exam                     |
| <i>Optional Block 2 "Electrical networks and systems"</i>  |   |                          |                          |
| OB 2.1   | Automatics and Telemechanics of Power Supply Systems  | 4                        | exam                     |
| OB 2.2   | Electrical Networks and Systems   | 4                        | exam                     |
| OB 2.3   | Electrical Plants and Systems of Energy Supply.   | 4                        | exam                     |
| OB 2.4   | Design of Power Supply Systems  | 4                        | exam                     |
| OB 2.5   | Intelligent Systems of Electroenergy  | 7                        | exam                     |
| OB 2.6   | Mathematical Tasks in Optimization Problems of Power Supply   | 5                        | exam                     |
| OB 2.7   | Transients in Power Supply Systems  | 7                        | exam                     |
| OB 2.8   | Modes Control of Electrical Networks  | 6                        | exam                     |
| <i>Optional Block 3 "Energy Supply"</i>  |   |                          |                          |
| OB 3.1   | Energy Saving in Heating Technologies   | 4                        | exam                     |
| OB 3.2   | Account and Regulation of Energy Distribution and Costs   | 4                        | exam                     |
| OB 3.3   | Heat and Energy Installations and Systems   | 4                        | exam                     |
| OB 3.4   | Heating Technologies of Production and Processing of Agricultural Product   | 4                        | exam                     |
| OB 3.5   | Integrated Use of Alternative and Renewable Energy Sources  | 5                        | exam                     |
| OB 3.6   | Modelling of Thermal and Hydrodynamic Processes   | 7                        | exam                     |
| OB 3.7   | Nanotechnology of Heat and Mass Transfer Intensification  | 6                        | exam                     |
| OB 3.8   | Optimization of Energy Supply Systems and Energy Efficiency   | 7                        | exam                     |
| <i>Optional Block 4 "Scientific and technical principles of electromechanical energy conversion"</i> |   |                          |                          |
| OB 4.1   | Reliability of Technical Systems and Technogenic Risks  | 4                        | exam                     |
| OB 4.2   | Accounting and Regulation of Energy Resources Costs   | 4                        | exam                     |
| OB 4.3   | Software of Physical Researches   | 4                        | exam                     |
| OB 4.4   | Technical Service of Power Equipment  | 4                        | exam                     |
| OB 4.5   | Mathematical Modeling of Electromagnetic Devices and Electromechanical Power Converters                                     | 7                        | exam                     |
| OB 4.6   | Reliability of Electromagnetic Devices and Electromechanical Power Converters   | 5                        | exam                     |
| OB 4.7   | Special Sections of Theoretical Electrical Engineering  | 7                        | exam                     |
| OB 4.8   | Asynchronous machines of high energy efficiency   | 6                        | exam                     |
| <i>Optional Block 5 "Electrotechnical systems of power consumption"</i>                              |   |                          |                          |
| OB 5.1   | Renewable Sources of Electric Energy Generation   | 4                        | exam                     |
| OB 5.2   | Design of Power Consumption Systems   | 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 |
|---|--|-------------------|-------------------|
| OB 5.3  | Relay Protection and Automation of Distribution Power Networks   | 4                 | exam              |
| OB 5.4  | Telemechanics and ACS of Power Supply Systems  | 4                 | exam              |
| OB 5.5  | Mathematical and Simulation Modeling of Processes in Electrical Networks and Systems                                 | 7                 | exam              |
| OB 5.6  | Estimation of Electrical Systems Modes   | 5                 | exam              |
| OB 5.7  | Electromechanical Transients in Electrical Systems   | 7                 | exam              |
| OB 5.8  | Algorithmization of Electric Power Problems  | 6                 | exam              |
| Optional Block 6 "Electrotechnics and electrotechnology"  |  |                   |                   |
| OB 6.1  | Electrotechnology Processing of Agricultural Products  | 4                 | exam              |
| OB 6.2  | Modeling of Adjustable Electric Drives, Aggregates and Production Lines  | 4                 | exam              |
| OB 6.3  | Fundamentals of energy efficiency of consumer grids  | 4                 | exam              |
| OB 6.4  | Fundamentals of bioenergy technologies   | 4                 | exam              |
| OB 6.5  | Electromagnetic Processing of Agricultural Products  | 7                 | exam              |
| OB 6.6  | Electrotechnology Research Methods   | 5                 | exam              |
| OB 6.7  | Energy Efficiency of Closed Biosystems   | 7                 | exam              |
| OB 6.8  | Physical and Technological Properties of Agricultural Products And Materials   | 6                 | exam              |
| Optional Block 7 "Lighting engineering and light sources" |  |                   |                   |
| OB 7.1  | Laser Technics   | 4                 | exam              |
| OB 7.2  | Design, Installation and Operation of Lighting Installations   | 4                 | exam              |
| OB 7.3  | Lighting Installations and Systems   | 4                 | exam              |
| OB 7.4  | Physical Bases of Light Sources and Energy Saving in Lighting Installations  | 4                 | exam              |
| OB 7.5  | Electrotechnical Devices of Lighting Systems   | 7                 | exam              |
| OB 7.6  | Modern Research Trends in Light Engineering  | 5                 | exam              |
| OB 7.7  | Methodology of Optoelectronic Systems Construction   | 7                 | exam              |
| OB 7.8  | Photonics and Application of Coherent Radiation Sources  | 6                 | exam              |
| Optional Block 8 "Energy and automation of biosystems"    |  |                   |                   |
| OB 8.1  | Design solutions for energy management   | 4                 | exam              |
| OB 8.2  | Accounting and management of energy consumption  | 4                 | exam              |
| OB 8.3  | Energy audit and management in agriculture   | 4                 | exam              |
| OB 8.4  | Energy management and project management   | 4                 | exam              |
| OB 8.5  | Intelligent systems in electricity   | 7                 | exam              |
| OB 8.6  | Mathematical problems in optimization problems of power supply   | 5                 | exam              |
| OB 8.7  | Transients in power systems  | 7                 | exam              |
| OB 8.8  | Control of operating modes of electric networks  | 6                 | exam              |
| The total amount of compulsory components                 |  | 54                |                   |
| The total amount of optional components                   |  | 49                |                   |
| 3. OTHER TYPES OF TRAINING                                |  |                   |                   |
| CC 16   | Practical Training   | 8                 |                   |
| CC 17   | Research Practice  | 5                 |                   |
| CC 18   | State certification  | 4                 |                   |
| THE TOTAL AMOUNT OF ERP                                   |  | 120               |                   |

**Annotations of disciplines in the curriculum**

**1. GENERAL TRAINING CYCLE**

**Compulsory components of EP**

**Safety in Electrical Installations.** Safety measures in normal and emergency modes of electrical installations. Safety during installation, repair and maintenance of electrical installations. Lightning protection of agricultural objects.



**Electromagnetic Compatibility.** Power quality. Quality of energy and its determination. Ensuring of sustainable functioning of normal power supply for any violations of modes. Transients in stations synchronous generator and electrical systems networks. Electromechanical transients in electrical systems for small and large disturbances.

**Information Technology.** Information and controlling complexes and systems. Concept of automated electricity metering systems in terms of energy market in Ukraine. The structures and features of the construction and information control systems and systems for electricity metering.

**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.

**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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EP

**Energy Supply.** External electrical networks, substations and rural power reserve. The equipment for power stations and substations. Relay protection and automation. Reliability of power supply. The quality of electricity.

**Energy Security.** Main provisions national energy security. Diversification of energy supply. Planning, organization and management of the power plants and industrial

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energy management. The main directions of formation of tariffs in the market. System Planning and preventive maintenance of equipment. Control power consumption. The energy balance. Rationing of fuel and energy resources. Energy consumption monitoring system. Energy-saving measures.

**Mathematical Modeling of Electrotechnical Systems and Their Components.**

Parameters of energy networks. Modeling of systems and networks parameters. Requirements for the performance of systems and networks, ways to support them. Criteria for optimizing network settings. How to optimize the network settings. Analysis of modes of power systems. Criteria for optimization of networks. Optimizing components of the cost of electricity.

**Methods of Synthesis and Analysis of ACS.** Intelligent systems. Tool environment intelligent systems. Technological means intelligent systems. Subsystem Automation programming tools and intelligent. The intelligent programming. Automation Programming Environment – TURBO. Systems EXSYS, GURU – ART. Hardware implementation of intelligent systems, element base. Examples of artificial intelligence.

**Basics of Energy Saving.** The main factors of energy savings in the industry. General questions determining the economic efficiency of capital investments in the energy sector. Fundamentals of electricity rationing. The main directions of energy saving various industries. Power saving modes in power systems industry.

**Design of Electrification, Automation and Energy Supply Systems.** Methodology Electrification system design, automation and energy agriculture. Computer technologies in design. Requirements for projects.

**Optimization Theory.** Fundamentals of linear and nonlinear mathematical programming. Mathematical models. Transport problem. Fundamentals of dynamic programming. Optimization models.

**Heat and Water Supply in Agriculture.** Heat power installations and heating system. Energy audit and management. Energy Efficiency of heat APC. Sources of water. Facilities for the abstraction of surface and groundwater. Distributors and internal water network.

**Technology of Maintenance and Repair of Electrical Equipment and Means of Automation.** Operation of transformer substations, switchgears, transmission lines, electric, lighting and Irradiation plants and electrically heated electric equipment, means of communication. The procedure for putting into operation mounted systems. Formation and Organization of instrumentation and automation tools. Operation of boilers, heat generators and heaters. The operation of power equipment.

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

**Optional components of EPP**

*Optional Block by specialty*

*Optional Block 1 "Automation of technological processes and computer integrated systems to control information and technological resources in agriculture"*

**Methods of Modern Process and Production Control in Energetics.**

Characteristics of technological processes as control facilities and their disturbances. Principles of automated process control systems. Automation of technological processes in energetics. Principles of the control system design. Information channels and their characteristics. Identification of control objects. Control algorithms. Technical means of automation. Reliability and economic efficiency of automation.

**Automated Systems in Energetics.** Principles of the control systems design. Information channels and their characteristics. Identification of control objects. Control

algorithms. Technical means of automation. Reliability and economic efficiency of automation.

**Typical Technological Processes in Energetics and Methods of Modeling.** Automation object; classification, structure and main characteristics of typical technological facilities, technologies and processes AIC branches. Physics and chemical basis of hydrodynamic, thermal, mass transfer, mechanical, chemical and technological processes. Calculation of the heat and mass transfer processes in agriculture technology processing and storage of agricultural products. Fundamentals of modeling and designing technological devices.

**Hardware and hardware of control systems in power engineering.** Principles of construction of ASUTP. Information channels and their characteristics. Identification of management objects. Management algorithms. Technical means of ACUTP. Reliability and cost-effectiveness of ACMS. Microprocessor and microcomputer architecture, microprocessor programming in assembler language, microprocessor hardware. Development and adjustment of microprocessor systems in agricultural production. Discrete signals, their encoding. DAC and ADC. Time and frequency domain analysis. Manageability and observability. Synthesis of digital systems. Limitations in microprocessor control systems.

*Optional Block 2 "Electrical networks and systems"*

**Automatics and Telemechanics of Energy Supply Systems.** Information management systems power supply. Means remotely control power supply systems. Telecontrol systems, telemeasuring and signaling. Channels of communication systems in automation and remote control. Dispatch of command and control equipment. Means of automation in the control systems of power supply. Techno-economic performance and automation telemechanization.

**Electrical Networks and Systems.** The electric part of substations and reserve power. Protection of rural electrical surge. Increasing economic efficiency and reliability of power supply systems of agriculture. Automation and control systems.

**Electrical Plants and Systems of Energy Supply.** The electric part of substations and reserve power. Protecting rural of electrical surge. Improving the efficiency and reliability of power supply systems of agriculture. Automation and control systems

**Design of Power Supply Systems in Agriculture.** Setting the specification, calculations, graphics creation and delivery of documents using CAD company Autodesk Ins. And subsystems CAD MathCad, AUTOCAD, and the best computer-integrated technologies. The mathematical description of the functioning ACS. Typical dynamic link ACS. Identification of facilities management models

*Optional Block 3 "Energy supply"*

**Energy Saving in Heating Technologies.** Sources of heat and electricity. Losses in the transmission of energy. Losses in transformers. Losses in transmission lines. Technical measures to reduce energy losses. Arrangements reduce energy losses

**Accounting and Control of Energy Resources Distribution and Costs.** Devices of accounting of active and reactive power. Regulators of reactive power. Multiplemetering. Devices for control of heat consumption. Counters of water and gas.

**Thermal Power Plants and Systems.** Sources of heat. Burning fossil fuels. Boiler systems. Heat. Heating system. Thermal network. Gas agriculture. Alternative heating sources of agricultural production.

**Heating Technologies of Production and Processing of Agricultural Product.** Sources of heat. Burning fossil fuels. Boiler systems. Heat. Heating systems. Thermal networks. Gas supply of agriculture. Alternative heating sources of agricultural production.

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*Optional Block 4 "Scientific and technical principles of electromechanical energy conversion"*

**Reliability of Technical Systems, Technogenic Risks.** The main categories and standards in reliability. Categories reliability of electricity supply. The quality of electricity. Man-made risks in the energy sector. Environmental aspects electrification of agriculture.

**Accounting and Regulation of Energy Resources Costs.** Devices of accounting of active and reactive power. Regulators of reactive power. Multiple-metering. Devices for control of heat consumption. Counters of water and gas.

**Technical Service of Energy Equipment.** Maintenance of transformer substations and power lines. Servicing of electrical consumers. Diagnosis of electrical equipment.

**Physical Research Software.** Computer technologies for visualization of modes and parameters of technological objects and production processes. Application packages for processing and transmitting information. Technical means of information technologies. Global Internet.

*Optional Block 5 "Electrotechnical systems of power consumption"*

**Renewable Sources of Electric Energy Generation.** Renewable sources of energy. The types of small plants. Features of small power plants and their role in the power supply of AIC. Comparative characteristics of small sources of electricity. The construction of small power plants.

**Design of Power Consumption Systems.** Setting the specification, calculations, graphics creation and delivery of documents using CAD company Autodesk Ins. And subsystems CAD Mathcad, Autocad, and the best computer-integrated technologies. The mathematical description of the functioning ACS. Typical dynamic link ACS. Identification of facilities management models.

**Relay Protection and Automation of Distribution Power Networks.** Theory and practice of automatic control modes of power supply systems using modern methods and means of automation and relay protection.

**Telemechanics and ACS of Power Supply Systems.** Theory of telemechanical signal transmission by channels of communication. Methods of improving noise immunity of signals. Principles of telecontrol, signaling, remote metering. Features of modern telemechanics, automatic supervisory control of power networks and power supply of industrial enterprises.

*Optional Block 6 "Electrotechnics and electrotechnology"*

**Agricultural Technology Electrotechnology.** Basics of converting electrical energy into thermal energy. Calculation of electric heating installations. Direct, indirect, arc, induction, dielectric, thermoelectric heating. Fundamentals of using optical radiation in agricultural production. Lighting and irradiation installations appointment. Electric heating installations appointment. Possibilities of using new electrotechnical techniques in agricultural production.

**Modeling of Adjustable Electric Drives, Aggregates and Production Lines.** Classification of models of induction motor (IM). Mathematical model of IM, powered by ideal voltage source. Consideration of the asymmetry of the electromagnetic system IM. The mathematical model of the IM, which is powered by the ideal source of alternating current. Conversion coordinates. Matrix Simulink-models of an asynchronous motor in an arbitrary orthogonal coordinate system. Models of IM in a two-phase stationary coordinate system of a stator. Mathematical models of an asynchronous motor in an orthogonal coordinate system, oriented on the vector of the flow of a rotor.

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**Fundamentals of energy efficiency of consumer grids.** The energy problem, its roots and approaches to solving it. General characteristics of the fuel and energy complex of Ukraine. Ensuring the energy security of the state. Energy Saving Potential in Ukraine. Energy Saving Legislation. Characteristic problems in the field of energy supply. Introduction of the latest technologies as a method of energy saving. Application of automatic energy management systems as a method of energy saving. Introduction of alternative energy sources as a method of energy saving. Energy-saving technologies in industry. Energy saving in agrarian and industrial complex.

**Fundamentals of bioenergy technologies.** Renewable resources for energy-generating bioenergy. Obtaining biomass of multi-enzyme systems for the conversion of chemical and light energy into renewable energy. Technologies for producing solid fuel from biomass (from green biomass, peat, coal and waste). Thermal methods, equipment and technologies for the production of energy from solid biomass and waste. Biofuels and prospects for their use. Biologics for intensification of bioenergy processes. Safety when operating this category of technology. Fuel Standards. Peculiarities of use of gas and liquid biofuels in power plants and their impact on them.

*Optional Block 7 "Lighting engineering and light sources"*

**Laser Technics.** Physical bases of quantum electronics. Physical bases of lasers. Active laser environments. Excitation systems in different types of lasers. Optical resonators. Properties of laser radiation. Optical amplifiers. Acquaintance with the physical foundations of quantum radiophysics and nonlinear optics and the most important characteristics of the corresponding devices.

**Design, Installation and Operation of Lighting Installations.** Organization and methodology of design work. The stage of working design. Requirements for electrical part of lighting installations. Electricity supply of lighting installations. Power supply circuits. Calculation of the lighting network. Compensation of reactive power. Protection of lighting networks. Types of postings and areas of their use. Grounding and Grounding in Lighting Networks. Installation of wiring and lighting fixtures. Operation and maintenance of lighting installations.

**Lighting Installations and Systems.** Normative and lighting calculations of lighting installations (LI). Principles, criteria and methods of valuation. Threshold characteristics of the visual process and methods of their study. The calculation of the spectral composition of radiation during the normalization of lighting installations. Choosing a normalized photometric characteristic. Standardization of quantitative and qualitative characteristics of lighting. Methods of calculating the quantitative indicators of the LI. Methods of calculation of qualitative indices of LI. Methods of calculation of power LI. Lighting software design and calculations of LI.

**Physical Bases of Light Sources and Energy Saving in Lighting Installations.** Physical processes in thermal, semiconductor (LED), gas-discharge light sources. Physical principles of light generation. Thermal radiation. Laws of thermal radiation. Zone theory of solids. Basic provisions of quantum mechanics. Luminescence and gas discharge Problems and prospects for increasing the efficiency of electricity use in lighting installations. Technological process of irradiation. The general principles of its energy assessment. Power analysis of power supply to the source of radiation, generation of flow in the source, flow formation of the reflector.

*Optional Block 8 "Energy audit"*

**Design solutions for energy management.** Design solutions for the arrangement of microclimate systems for construction and engineering structures. Dynamics of energy tariffs. Key energy efficiency measures. Energy efficiency in the field of production,

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transmission and consumption of electric and thermal energy. Criteria and practical methods for determining energy efficiency. Main directions of energy saving. World experience, achievements and strategic guidelines for energy efficiency policy.

**Accounting and management of energy consumption.** Regulatory and legislative principles of energy accounting. Devices of providing of the account of energy carriers. Initial processing and analysis of information received. Automated commercial energy metering systems. Automated energy management systems. Instrumental surveys. Measurement of energy and resource costs.

**Energy audit and management in agribusiness.** Primary energy audit. Instrumental survey of buildings and engineering structures. Collection and analysis of energy source information. The main indicators of the energy passport. Energy balance of the enterprise. Methods of obtaining energy balances and energy characteristics of aggregates.

**Energy management and project management.** Energy certification of buildings. Physical and financial-economic methods of energy efficiency analysis. Classification of buildings by specific energy consumption indicators. Regulatory requirements for energy efficiency of buildings. State and development of technical and economic solutions for thermal protection of buildings and engineering structures. Rationale and choice of technical solutions for thermo-modernization. International financial and economic assistance programs and projects and mechanisms for their implementation.

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

#### **Optional components of ERP**

##### *Optional Block by specialty*

##### *Optional Block 1 "Energy Efficient Control Systems of Biotechnological Objects"*

**Methods of Modern Process and Production Control in Energetics.** Characteristics of technological processes as control facilities and their disturbances. Principles of automated process control systems. Automation of technological processes in energetics. Principles of the control system design. Information channels and their characteristics. Identification of control objects. Control algorithms. Technical means of automation. Reliability and economic efficiency of automation.

**Automated Systems in Energetics.** Principles of the control systems design. Information channels and their characteristics. Identification of control objects. Control algorithms. Technical means of automation. Reliability and economic efficiency of automation.

**Typical Technological Processes in Energetics and Methods of Modeling.** Automation object; classification, structure and main characteristics of typical technological facilities, technologies and processes AIC branches. Physics and chemical basis of hydrodynamic, thermal, mass transfer, mechanical, chemical and technological processes. Calculation of the heat and mass transfer processes in agriculture technology processing and storage of agricultural products. Fundamentals of modeling and designing technological devices.

**Hardware and hardware of control systems in power engineering.** Principles of construction of ASUTP. Information channels and their characteristics. Identification of management objects. Management algorithms. Technical means of ACUTP. Reliability and cost-effectiveness of ACMS. Microprocessor and microcomputer architecture, microprocessor programming in assembler language, microprocessor hardware. Development and adjustment of microprocessor systems in agricultural production. Discrete signals, their encoding. DAC and ADC. Time and frequency domain analysis.

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Manageability and observability. Synthesis of digital systems. Limitations in microprocessor control systems.

**Biotechnological Automation Objects, Methods of Its Research and Modeling.**

Automation object; classification, structure and main characteristics of typical technological facilities, technologies and processes AIC branches. Physico-chemical basis of hydrodynamic, thermal, mass transfer, mechanical, chemical and technological processes. Calculation of the heat and mass transfer processes in agriculture technology processing and storage of agricultural products. Fundamentals of modeling and designing technological devices.

**Information Technology of Control Systems.** Computer technology for visualization modes and parameters of technological facilities and production processes. Applications for processing and transmitting of information. Technical means of information technology.

**Computer Integrated Control Systems in Agriculture.** The architecture of the microprocessor and microcomputer, microprocessor programming in assembly language, microprocessor-based hardware systems. Development and debugging microprocessor systems in agricultural production. Discrete signals, their coding. DAC and ADC. The analysis in the time and frequency domains. Manageability. The synthesis of digital systems. Restrictions in microprocessor control systems.

**Modern Methods of Design Automation Systems of Biotechnological Objects.**

Characteristics of technological processes as control facilities and their disturbances. Principles of automated process control systems. Automation of technological processes in energetics. Principles of the control system design. Information channels and their characteristics. Identification of control objects. Control algorithms. Technical means of automation. Reliability and economic efficiency of automation.

*Optional Block 2 "Electrical stations, networks and systems"*

**Automatics and Telemechanics of Energy Supply Systems.** Information management systems power supply. Means remotely control power supply systems. Telecontrol systems, telemeasuring and signaling. Channels of communication systems in automation and remote control. Dispatch of command and control equipment. Means of automation in the control systems of power supply. Techno-economic performance and automation telemechanization.

**Electrical Networks and Systems.** The electric part of substations and reserve power. Protection of rural electrical surge. Increasing economic efficiency and reliability of power supply systems of agriculture. Automation and control systems.

**Electrical Plants and Systems of Energy Supply.** The electric part of substations and reserve power. Protecting rural of electrical surge. Improving the efficiency and reliability of power supply systems of agriculture. Automation and control systems

**Design of Power Supply Systems in Agriculture.** Setting the specification, calculations, graphics creation and delivery of documents using CAD company Autodesk Ins. And subsystems CAD MathCad, AUTOCAD, and the best computer-integrated technologies. The mathematical description of the functioning ACS. Typical dynamic link ACS. Identification of facilities management models/

**Intelligent systems of electroenergy.** Information and controlling complexes and systems. Concepts of automated electricity metering systems in terms of energy market in Ukraine. The structures and features of the existing building and information management systems and systems for metering.

**Mathematical Tasks in Optimization Problems of Power Supply.** Basic definitions and concepts. Model, modeling, object, subject of study. Requirements for the model with position specific goals and objectives of the study. Conditional distribution

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models for analytical, experimental and experimental, analytical. Main phases: setting objectives and research, construction of a mathematical model, algorithm development and application limitations of variable factors, verification of compliance and analysis of the obtained results.

**Transients in Power Supply Systems.** Ensuring sustainable of normal functioning of supply for any violation. Transients in synchronous generators of electric stations and networks systems. Electromechanical transients in electrical systems for small and large disturbances.

**Modes Control of Electrical Networks.** The concept of modes. Modern principles, methods and tools for monitoring and control power consumption. Of Electrical substations and reserve power. Protection of rural electrical surge. Improving economic efficiency and reliability of power supply systems of agriculture. Automation and control systems Telemechanization supply.

### *Optional Block 3 "Energy Supply"*

**Energy Saving in Heating Technologies.** Sources of heat and electricity. Losses in the transmission of energy. Losses in transformers. Losses in transmission lines. Technical measures to reduce energy losses. Arrangements reduce energy losses

**Accounting and Control of Energy Resources Distribution and Costs.** Devices of accounting of active and reactive power. Regulators of reactive power. Multiplemetering. Devices for control of heat consumption. Counters of water and gas.

**Thermal Power Plants and Systems.** Sources of heat. Burning fossil fuels. Boiler systems. Heat. Heating system. Thermal network. Gas agriculture. Alternative heating sources of agricultural production.

**Heating Technologies of Production and Processing of Agricultural Product.** Sources of heat. Burning fossil fuels. Boiler systems. Heat. Heating systems. Thermal networks. Gas supply of agriculture. Alternative heating sources of agricultural production.

**Integrated Use of Alternative and Renewable Energy Sources.** Using of alternative and renewable sources of energy is an effective method of energy saving of energy resources. The principles of these energy sources, which include heat pumps, solar panels, biogas and wind installations, geothermal installations are presented. The methods of calculation and means of the integrated use of various sources of energy for different objects.

**Modeling of Heat and Hydrodynamic Processes.** Bases mathematical modeling of mass and energy transfer in thermal power plants and systems. The modeling is based on the development of physical models transfer, use transport equations and boundary conditions describing these processes. For the solution of transport equations using numerical methods, including software packages that allow you to get all the local thermal characteristics of the process. Simulation is an effective means for optimizing power equipment

**Nanotechnology of Intensification of Heat and Mass Transfer Processes.** Nanotechnologies are an effective tool for intensification of heat and mass transfer in power plants and systems. The analysis of the main approaches that are allowed to apply nanotechnology in agriculture. The basic principles of discrete input pulse energy installations in the agricultural and food production. Using this approach makes it possible to significantly improve the efficiency of thermal power equipment.

**Optimization of Energy Supply and Energy Saving Systems.** The basic methods for optimization the power supply systems. Optimization methods based on the determination of thermal and hydraulic losses in power systems, such as heating and water systems, boilers, power plants and other facilities. Special attention is given to the use in energy systems and renewable energy use economic analysis.

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*Optional Block 4 "Scientific and Technical Principles of Electromechanical Energy Conversion"*

**Reliability of Technical Systems, Technogenic Risks.** The main categories and standards in reliability. Categories reliability of electricity supply. The quality of electricity. Man-made risks in the energy sector. Environmental aspects electrification of agriculture.

**Accounting and Regulation of Energy Resources Costs.** Devices of accounting of active and reactive power. Regulators of reactive power. Multiple-metering. Devices for control of heat consumption. Counters of water and gas.

**Technical Service of Energy Equipment.** Maintenance of transformer substations and power lines. Servicing of electrical consumers. Diagnosis of electrical equipment.

**Physical Research Software.** Computer technologies for visualization of modes and parameters of technological objects and production processes. Application packages for processing and transmitting information. Technical means of information technologies. Global Internet.

**Mathematical Modeling of Electromagnetic Devices and Electromechanical Energy Converters.** Analytical methods of mathematical modeling of objects agricultural production. Methods of mathematical models. Construction of mathematical models electrotechnological equipment analytical method and the results of the experiment. Analysis models and their optimization.

**Reliability of Electromagnetic Devices and Electromechanical Energy Converters.** Basic concepts, performance and position of integrated program reliability, calculation methods and improve the reliability of the results of tests and operation of electromagnetic and electromechanical devices, power converters, reliability analysis, a system providing spare parts, determining the reliability of technical systems for an operator.

**Special Sections of Theoretical Electrical Engineering.** The method of conformal mapping and its application to calculate the static electromagnetic fields in electromechanical devices and converters. Basic theory and technology of modeling. The method of integral equations calculate static fields.

**Asynchronous machines of high energy efficiency.** Study of the basics of the electromagnetism theory and general principles of electromechanical energy conversion, their practical use for the design and operation of electric machines.

*Optional Block 5 "Electrotechnical systems of power consumption"*

**Renewable Sources of Electric Energy Generation.** Renewable sources of energy. The types of small plants. Features of small power plants and their role in the power supply of AIC. Comparative characteristics of small sources of electricity. The construction of small power plants.

**Design of Power Consumption Systems.** Setting the specification, calculations, graphics creation and delivery of documents using CAD company Autodesk Ins. And subsystems CAD Mathcad, Autocad, and the best computer-integrated technologies. The mathematical description of the functioning ACS. Typical dynamic link ACS. Identification of facilities management models.

**Relay Protection and Automation of Distribution Power Networks.** Theory and practice of automatic control modes of power supply systems using modern methods and means of automation and relay protection.

**Telemechanics and ACS of Power Supply Systems.** Theory of telemechanical signal transmission by channels of communication. Methods of improving noise immunity of signals. Principles of telecontrol, signaling, remote metering. Features of modern

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telemechanics, automatic supervisory control of power networks and power supply of industrial enterprises.

**Mathematical and Simulation Modeling of Processes in Electrical Networks and Systems.** Parameters of energy networks. Simulation parameters and network analysis. Requirements for performance of networks and ways to support them. Criteria for optimizing network settings. How to optimize the network settings. Analysis modes of energy networks. Criteria for optimization of networks. Optimizing components of the cost of electricity.

**Estimation of Electrical Systems Modes.** Modes of electrical systems and their modeling. Analysis modes. Information control systems of power supply. Telecontrol systems, telemeasuring and signaling. Dispatch of command and control equipment. Means of automation control systems power supply. Techno-economic performance and automation telemechanization.

**Electromechanical Transients in Electrical Systems.** Ensuring sustainable of normal functioning of supply for any violation. Transients in synchronous generators of electric stations and networks systems. Electromechanical transients in electrical systems for small and large disturbances.

**Algorithmization of Electric Power Problems.** Fundamentals of linear and nonlinear mathematical programming. Mathematical models. Transport problem. Fundamentals of dynamic programming. Optimization models.

*Optional Block 6 "Electrotechnics and electrotechnology"*

**Agricultural Technology Electrotechnology.** Basics of converting electrical energy into thermal energy. Calculation of electric heating installations. Direct, indirect, arc, induction, dielectric, thermoelectric heating. Fundamentals of using optical radiation in agricultural production. Lighting and irradiation installations appointment. Electric heating installations appointment. Possibilities of using new electrotechnical techniques in agricultural production.

**Modeling of Adjustable Electric Drives, Aggregates and Production Lines.** Classification of models of induction motor (IM). Mathematical model of IM, powered by ideal voltage source. Consideration of the asymmetry of the electromagnetic system IM. The mathematical model of the IM, which is powered by the ideal source of alternating current. Conversion coordinates. Matrix Simulink-models of an asynchronous motor in an arbitrary orthogonal coordinate system. Models of IM in a two-phase stationary coordinate system of a stator. Mathematical models of an asynchronous motor in an orthogonal coordinate system, oriented on the vector of the flow of a rotor.

**Fundamentals of energy efficiency of consumer grids.** The energy problem, its roots and approaches to solving it. General characteristics of the fuel and energy complex of Ukraine. Ensuring the energy security of the state. Energy Saving Potential in Ukraine. Energy Saving Legislation. Characteristic problems in the field of energy supply. Introduction of the latest technologies as a method of energy saving. Application of automatic energy management systems as a method of energy saving. Introduction of alternative energy sources as a method of energy saving. Energy-saving technologies in industry. Energy saving in agrarian and industrial complex.

**Fundamentals of bioenergy technologies.** Renewable resources for energy-generating bioenergy. Obtaining biomass of multi-enzyme systems for the conversion of chemical and light energy into renewable energy. Technologies for producing solid fuel from biomass (from green biomass, peat, coal and waste). Thermal methods, equipment and technologies for the production of energy from solid biomass and waste. Biofuels and prospects for their use. Biologics for intensification of bioenergy processes. Safety when

operating this category of technology. Fuel Standards. Peculiarities of use of gas and liquid biofuels in power plants and their impact on them.

**Electromagnetic Processing of Agricultural Products.** Investigation of electromagnetic processes and work of electrotechnical equipment in agriculture. Electric power sources and installations for electromagnetic processing of agricultural materials, the basis of the strong magnetic fields use theory in the processing of seeds, taking into account its properties. Ozonization. Electro-pulse technology and technology.

**Electrotechnology Research Methods.** Research of electro-technological processes and work of the electrotechnological equipment in agriculture. Electric power sources and installations for electrophysical processing of agricultural materials. Fundamentals of strong electric fields use theory in the seeds processing taking into account its properties. Ozonization. Electricity treatment. Electro-impulse technics and technology, ultrasonic and magnetic materials processing.

**Energy Efficiency of Closed Biosystems.** Research of electrotechnical processes and work of the electrotechnical equipment in agriculture. Electric power sources and installations for electrophysical processing of agricultural materials. Determination of energy efficiency of electrotechnical equipment in agriculture.

**Physical and Technological Properties of Agricultural Products and Materials.** Physical and technological bases of hydrodynamic, thermal, mass-exchange, mechanical, chemical-technological processes. Calculation of parameters of thermal and mass-exchange processes. Technology of processing and storage of agricultural products. Fundamentals of modeling and designing of technological devices. Analytical methods of modeling of technological processes. Methods of identification of technological processes. Examples of simulation of typical technological processes. Check the adequacy of mathematical models for technological processes.

*Optional Block 7 "Lighting engineering and light sources"*

**Laser Technics.** Physical bases of quantum electronics. Physical bases of lasers. Active laser environments. Excitation systems in different types of lasers. Optical resonators. Properties of laser radiation. Optical amplifiers. Acquaintance with the physical foundations of quantum radiophysics and nonlinear optics and the most important characteristics of the corresponding devices.

**Design, Installation and Operation of Lighting Installations.** Organization and methodology of design work. The stage of working design. Requirements for electrical part of lighting installations. Electricity supply of lighting installations. Power supply circuits. Calculation of the lighting network. Compensation of reactive power. Protection of lighting networks. Types of postings and areas of their use. Grounding and Grounding in Lighting Networks. Installation of wiring and lighting fixtures. Operation and maintenance of lighting installations.

**Lighting Installations and Systems.** Normative and lighting calculations of lighting installations (LI). Principles, criteria and methods of valuation. Threshold characteristics of the visual process and methods of their study. The calculation of the spectral composition of radiation during the normalization of lighting installations. Choosing a normalized photometric characteristic. Standardization of quantitative and qualitative characteristics of lighting. Methods of calculating the quantitative indicators of the LI. Methods of calculation of qualitative indices of LI. Methods of calculation of power LI. Lighting software design and calculations of LI.

**Physical Bases of Light Sources and Energy Saving in Lighting Installations.** Physical processes in thermal, semiconductor (LED), gas-discharge light sources. Physical principles of light generation. Thermal radiation. Laws of thermal radiation. Zone theory of solids. Basic provisions of quantum mechanics. Luminescence and gas

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discharge Problems and prospects for increasing the efficiency of electricity use in lighting installations. Technological process of irradiation. The general principles of its energy assessment. Power analysis of power supply to the source of radiation, generation of flow in the source, flow formation of the reflector.

**Electrotechnical Devices of Lighting Systems.** The basics of electrotechnical devices of light engineering systems. Analysis of ballasts and their influence on the work of digital light sources. Types of ballast resistances. Dependence of electrical parameters of discharge lamps and ballasts on the supply voltage. Classification of circuits for the inclusion of discharge lamps and requirements for start-up equipment. Application of electrical engineering devices of lighting systems. Impulse illumination of fluorescent lamps. Without starlight illumination of fluorescent lamps. Types of ballast resistances. Illumination of two-electrode gas-discharge lamps of high pressure. Illuminating circuit diagrams are four electrodes gas discharge lamps of high pressure.

**Modern Research Trends in Light Engineering.** Trends in development and directions of scientific research in the main sections of electrical engineering. World trends of electric power industry. Decentralization of electricity generation. Cogeneration. Generation of electricity from renewable energy sources. Intelligent control, system and local automation, monitoring of loads in the electric power industry. Micro networks and smart grids. Stability of electric power systems. Environmental issues and safety. Hybrid lighting. The problem of electromagnetic compatibility of light sources, current correction. Optoelectronics.

**Methodology of Optoelectronic Systems Construction.** Receivers of radiation. Key features and options. Scanners. Solar panels. Optocouplers. Fundamentals of Integral Optics. Indicators. Screens. Projection systems. LEDs. Light propagation in light wave. Dispersion of fiber optics. Fiber optic cables. Transmitting and receiving modules. Switching elements.

**Photonics and Application of Coherent Radiation Sources.** Physical bases of interaction of quantum systems with electromagnetic field. The subject and basic concepts of photonics, quantum electronics and laser technology. Features, practical use, classification of sources of coherent radiation and prospects for the development of optical systems. Physical bases of interaction of quantum systems with electromagnetic field. Homogeneous and heterogeneous expansion of spectral lines. Physical mechanisms of expansion. Principles of functioning of sources of optical radiation (lasers) and methods of registration, their application. Principles of laser operation. Basic types of amplifiers and lasers. Receivers of optical radiation. Materials for photonics. Crystal environments.



**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"**

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|--|--|
| Form of Training:                                | Licensed number of persons:                                |
| – Full-time                                      | 35   |
| Duration of training:                            |  |
| – Full-time educational and professional program | 1,5 years  |
| – Full-time educational and research program     | 2 years  |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| – educational and research program               | 120  |
| Language   | Ukrainian, English   |
| Qualification of graduates:                      | research engineer of<br>computer systems and<br>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 programming of the Internet of things, features of development of the software for a

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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 for Master's 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.

**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>1. 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 EPP</b>  |  |                   |                                  |
| <i>Optional subjects by Student's Choice</i>   |  |                   |                                  |
| OB 1   | Optional subject 1   | 4                 | exam                             |
| OB 2   | Optional subject 2   | 4                 | exam                             |
| <b>2. 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: automation of technological processes  | 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                             |
| <b>Optional components of EPP</b>  |  |                   |                                  |
| <i>Optional Block by specialty</i>   |  |                   |                                  |
| <i>Optional Block 1 "Computer-Integrated Process Control Systems and production"</i> |  |                   |                                  |
| OB 1.1.  | World experience of methods and means of modern automated process control  | 4                 | exam                             |
| OB 1.2.  | Features of modeling of computer-integrated systems of automation of biotechnical objects                            | 4                 | exam                             |
| OB 1.3.  | Modeling and Identification of Biotechnical Objects in Agriculture   | 4                 | exam                             |
| OB 1.4.  | Protection of information in automation systems  | 4                 | exam                             |
| <i>Optional Block 2 "Internet of Things"</i>   |  |                   |                                  |
| OB 2.1.  | Design of Internet systems of Things   | 4                 | exam                             |
| OB 2.2.  | Cloudy Technology  | 4                 | exam                             |
| OB 2.3.  | Maintenance of the Internet of Things  | 4                 | exam                             |
| OB 2.4.  | Internet of Things programming   | 4                 | exam                             |
| <b>The total amount of compulsory components</b>                                     |  | <b>52</b>         |                                  |
| <b>The total amount of optional components</b>                                       |  | <b>24</b>         |                                  |
| <b>3. OTHER TYPES OF TRAINING</b>  |  |                   |                                  |
| CC 14  | Practical Training   | 10                | exam                             |
| CC 15  | Writing and Defense of Master's Thesis   | 4                 | Protection of qualification work |
| <b>THE TOTAL AMOUNT OF EPP</b>   |  | <b>90</b>         |                                  |

## Annotations of subjects in the curriculum

### 1. 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.

### 2. 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.

**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.

**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. uzzy 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**

#### *Optional Block by 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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of ERP</b>             |  |                   |                   |
| <b>CC 1.</b>                                    | Agricultural Policy  | 4                 | exam              |
| <b>CC 2.</b>                                    | Business Foreign Language  | 4                 | exam              |
| <b>CC 3.</b>                                    | Special Sections of High Mathematics   | 4                 | exam              |
| <b>CC 4.</b>                                    | Calculations of economic efficiency of scientific developments   | 4                 | exam              |
| <b>CC 5.</b>                                    | Safety in the Area   | 4                 | exam              |
| <b>CC 6</b>                                     | Methodology and Organization of Scientific Research on the Basics of Intellectual Property                           | 4                 | exam              |
| <b>Optional components of ERP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 4                 | exam              |
| OB 2  | Optional subject 2   | 4                 | exam              |
| <b>2. 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: automation of technological processes  | 4                 | exam                             |
| CC 10.   | Automation of biotechnical objects: automated process control systems  | 4                 | exam                             |
| CC 11.   | Computer aided design systems for automation of biotechnical objects   | 4                 | exam                             |
| CC 12.   | Installation, adjustment and operation of automation systems of biotechnical objects                                 | 4                 | exam                             |
| CC 13.   | Artificial intelligence in automation systems of biotechnical objects  | 4                 | exam                             |
| CC 14.   | Robotic Complex and Systems  | 4                 | exam                             |
| CC 15.   | Intelligent Control Systems of Biotechnical Objects  | 12                | exam                             |
| <b>Optional components of ERP</b>  |  |                   |                                  |
| <i>Optional Block 1 "Energy Efficient Control Systems of Biotechnological Objects"</i> |  |                   |                                  |
| OB 1.1.  | World experience of methods and means of modern automated process control  | 5                 | exam                             |
| OB 1.2.  | Special Systems  | 5                 | exam                             |
| OB 1.3.  | Methods for Preparing Research   | 5                 | exam                             |
| OB 1.4.  | Modeling and Identification of Biotechnical Objects in Agriculture   | 5                 | exam                             |
| OB 1.5.  | Computer Integrated Control Systems  | 5                 | exam                             |
| <b>The total amount of compulsory components</b>                                       |  | <b>87</b>         |                                  |
| <b>The total amount of optional components</b>   |  | <b>33</b>         |                                  |
| <b>3. OTHER TYPES OF TRAINING</b>  |  |                   |                                  |
| CC 16  | Practical Training   | 15                | exam                             |
| CC 17  | Writing and Defense of Master's Thesis   | 4                 | Protection of qualification work |
| <b>THE TOTAL AMOUNT OF ERP</b>   |  | <b>120</b>        |                                  |

### Annotations of subjects in the curriculum

#### 1. 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.

## 2. 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: automation of technological processes.** Specifications processes as facilities management and their disturbances. Principles of automated process control systems. Automation of technological processes in crop and livestock production.

**Automation of biotechnical objects: automated process control systems.** Principles of control systems. Information channels and their characteristics. Identification

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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.

**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.

### **Optional components of ERP**

*Optional Block by 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.

**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

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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.** 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.

**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 – Doctor of Technical Sciences, professor Olena Pinchevska

Departments in charge of graduate training:

**Wood products technologies and design:**

Tel.: (044) 527-81-67

E-mail: opinchewska@gmail.com

Head of department – Doctor of Technical Sciences, professor Olena Pinchevska

**Specialty 205 "Forestry"**

***Educational program "Forestry"***

Guarantor of the educational and professional program – doctor of science, professor Roman Vasylyshyn

Departments in charge of graduate training:

**Forest restoration and meliorations**

Tel.: (044) 527-87-47

E-mail: forest\_crops@nubip.edu.ua

Head of the Department – PhD of Agricultural Sciences, professor Viktor Maurer

**Silviculture**

Tel.: (044) 527-82-82

E-mail: lisivnutstvo@gmail.com, npuzrina@nubip.edu.ua

Head of the Department – doctor of science, professor Anatolii Bondar

**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

**Specialty 206 “Park and Gardening Management”**

***Educational program “Park and Gardening Management”***

Guarantor of the program - Doctor of sciences, professor Sergij Kovalevskiy

Departments in charge of graduate training:

**Landscape Architecture and Phytodesign:**

Tel.: (044) 527-85-47,

E-mail: okolesnichenko67@gmail.com

Head of the department - biological sciences, professor Olena Kolesnichenko

**Botany, Dendrology and Forest Tree Breeding:**

Tel.: (+38044) 527-85-18

E-mail: dendrology.nubip@gmail.com

Head of the department - Candidate of agricultural sciences, associated professor Yuri Marchyk

**Forest restoration and meliorations**

Tel.: (044) 527-87-47

E-mail: forest\_crops@nubip.edu.ua

Head of the Department – PhD of agricultural sciences, professor Viktor Maurer



**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 | 1,5 years  |
| – Part-time                                      | 1,5 years  |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of Teaching                             | Ukrainian  |
| 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 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 for Master Theses**

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.

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>1. GENERAL TRAINING CYCLE</b>                   |   |                   |                            |
| <b>Compulsory components of EPP</b>                |   |                   |                            |
| CC 1   | Actual Problems of Mechanical Wood Processing   | 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   | Business Foreign Language   | 4                 | Exam                       |
| CC 5   | Methodology and Organization of Scientific Research on the Basics of Intellectual Property in Woodworking Technological processes | 4                 | Exam                       |
| <b>Optional components of EPP</b>                  |   |                   |                            |
| <i>Optional subjects by Student's Choice</i>       |   |                   |                            |
| OB 1   | Optional subject 1  | 4                 | Exam                       |
| OB 2   | Optional subject 2  | 4                 | Exam                       |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>    |   |                   |                            |
| <b>Compulsory components of EPP</b>                |   |                   |                            |
| CC 6   | Planning and Design of Wood Products  | 11                | Exam                       |
| CC 7   | The Theory and Practice of Mechanical Wood Processing   | 6                 | Exam                       |
| CC 8   | Modeling and Optimization of Technological Processes  | 4                 | Exam                       |
| <b>Optional components of EPP</b>                  |   |                   |                            |
| <i>Optional Block by specialty</i>                 |   |                   |                            |
| <i>Optional Block 1 "Woodworking technologies"</i> |   |                   |                            |
| OB 1.1   | Planning at the Woodworking Industry  | 4                 | Exam                       |
| OB 1.2   | Mechanics of wood   | 4                 | Exam                       |
| OB 1.3   | Newest Woodworking Equipment  | 4                 | Exam                       |
| OB 1.4   | Technology Of Special Woodworking Industries  | 4                 | Exam                       |
| <i>Optional Block 2. "Furniture technologies"</i>  |   |                   |                            |
| OB 2.1   | Foreign Trade in the Furniture Enterprises  | 4                 | Exam                       |
| OB 2.2   | Mechanical and Technological Properties of Wooden Structures  | 4                 | Exam                       |
| OB 2.3   | Modern Equipment for the Furniture Production   | 4                 | Exam                       |
| OB 2.4   | Bonding theory and technology   | 4                 | Exam                       |
| <b>The total amount of compulsory components</b>   |   | <b>43</b>         |                            |
| <b>The total amount of optional components</b>     |   | <b>24</b>         |                            |
| <b>3. OTHER TYPES OF TRAINING</b>                  |   |                   |                            |
| CC 9   | Training practice   | 2                 | Credit                     |
| CC 10  | Production practice   | 17                | Credit                     |
| CC 11  | Preparation and defense of master's thesis  | 4                 | Defense of master's thesis |
| <b>THE TOTAL AMOUNT OF EPP</b>                     |   | <b>90</b>         |                            |

## Annotations of subjects in the curriculum

### 1. GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Actual Problems of Mechanical Woodworking.** The theoretical justification of cutting wood and wood materials, the direction of cutting theory, ways to improve wood cutting machines and tools Wood modes sawing, milling, turning, grinding and deep processing of wood by improving stability Wood period instruments. The mastery of competencies in technology use of wood energy, developing creative thinking skills of rational use of woody biomass as fuel and related equipment, testing and implementation of technologies, technical energy use and protecting the environment. The main tasks of practical part is to study the main types of wood as a raw fuel materials, the characteristics of their production, the study of modern technological processes of woody biomass by improving quality and reducing production costs.

**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.

**Business Foreign Language.** Speech Etiquette communication: language models salutation, civility, forgiveness, coordination and more. Linguistic and cultural aspects of international exhibitions. Grammatical and a minimum of linguistic communicative level presentations. Professionally-oriented foreign-language sources. Methods of finding new information in the foreign-language sources. Linguistic methods for analytical processing of foreign sources. The study of foreign language printed original literature and expansion of vocabulary and grammatical skills. Methods and linguistic features of annotation and summarization of foreign sources. Electronic foreign-language sources. Finding information on the Internet by using keywords. Fundamentals of Translation professionally oriented foreign-language sources. Machine translation of large volumes of foreign language information. Lexical minimum computer (information) technology.

**Methodology and Organization of Scientific Research on the Basics of Intellectual Property in Woodworking Technological processes.** 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.

### 2. 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

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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.

### **Optional components of EPP**

*Optional Block by 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.



**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 | 1,5 years                   |
| – Part-time                                      | 1,5 years                   |
| 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"***

Focuses on the formation of a complex of professional knowledge and practical skills for students to solve important problems of development of bioecological foundations of a complex system of protection and rehabilitation of forest biocenoses, study of

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pathogens in forest plantations and development of 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).

### ***Optional Block "Forest melioration"***

It provides an in-depth mastery of theoretical knowledge and the latest technologies for the creation and use of protective forest plantations as an integral part of zone anti-erosion systems.

#### **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 for Master Theses**

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.

4. An improvement of high-quality composition and increase of the forest planting productivity 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>1. GENERAL TRAINING CYCLE</b>                                   |  |                   |                   |
| <b>Compulsory components of EPP</b>                                |  |                   |                   |
| CC 1   | Forestry Management  | 4                 | exam              |
| CC 2   | Regulation of forest productivity  | 5                 | exam              |
| CC 3   | Forest policy  | 4                 | exam              |
| CC 4   | Business 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>Optional subjects by Student's Choice</i>                       |  |                   |                   |
| OB 1   | Optional subject 1   | 4                 | exam              |
| OB 2   | Optional subject 2   | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                    |  |                   |                   |
| <b>Compulsory components of EPP</b>                                |  |                   |                   |
| CC 6   | GIS technology   | 5                 | exam              |
| CC 7   | Planning Forestry  | 6                 | exam              |
| <b>Optional components of EPP</b>                                  |  |                   |                   |
| <i>Optional Block by specialty</i>                                 |  |                   |                   |
| <i>Optional Block 1 "Applied Silviculture and Game Management"</i> |  |                   |                   |
| OB 1.1   | Timber Industry  | 5                 | exam              |
| OB 1.2   | Forest Roads and Forest Transport  | 5                 | exam              |
| OB 1.3   | Non-wood Resources and Side Uses of the Forest   | 4                 | exam              |
| OB 1.4   | The Biological Basis of Clear Cuttings   | 6                 | exam              |
| OB 1.5   | Protection and reproduction of hunting resources   | 5                 | exam              |
| <i>Optional Block 2 "Integrated Fire and Pest Management"</i>      |  |                   |                   |
| OB 2.1   | Forest Pathology   | 4                 | exam              |
| OB 2.2   | Monitoring Harmful Organisms of Forest Ecosystems  | 6                 | exam              |
| OB 2.3   | Integrated Forest Protection   | 5                 | exam              |
| OB 2.4   | Early warning and wildfire hazards in forests  | 5                 | exam              |
| OB 2.5   | Integrated landscape fire management   | 5                 | exam              |
| <i>Optional Block 3 "Forest restoration and meliorations"</i>      |  |                   |                   |
| OB 3.1   | Modern technologies of seed production and nursery   | 4                 | exam              |
| OB 3.2   | Ecoadaptation forest restoratorion   | 4                 | exam              |
| OB 3.3   | Industrial methods of forest plantations   | 8                 | exam              |
| OB 3.4   | Forest-cultural methods to increase the productivity of forests  | 5                 | exam              |
| OB 3.5   | Systems of erosion soils control   | 4                 | exam              |

| <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 4 "Reforestation and afforestation"</i>                      |   |                          |                          |
| OB 4.1   | Modern technologies of seed production and nursery  | 4                        | exam                     |
| OB 4.2   | Microclonal reproduction of woody plants  | 6                        |                          |
| OB 4.3   | Modern approaches to forest reproduction  | 5                        | exam                     |
| OB 4.4   | Forest-cultural methods to increase the productivity of forests   | 5                        | exam                     |
| OB 4.5   | Forest plants of green belts  | 5                        | exam                     |
| <i>Optional Block 5 "Forest melioration"</i>                                   |   |                          |                          |
| OB 5.1   | Erosion science and systems of soils erosion control  | 5                        | exam                     |
| OB 5.2   | Protective afforestation  | 5                        | exam                     |
| OB 5.3   | Protective plantations management   | 5                        | exam                     |
| OB 5.4   | Optimization of forest-agricultural landscapes  | 5                        | exam                     |
| OB 5.5   | Forest recultivation of lands   | 5                        | exam                     |
| <i>Optional Block 6 "Management of forest resources and forestry business"</i> |   |                          |                          |
| OB 6.1   | Forest Recourses Management   | 5                        | exam                     |
| OB 6.2   | External Economic Activity in Forestry Sector   | 4                        | exam                     |
| OB 6.3   | Forest Information Systems  | 6                        | exam                     |
| OB 6.4   | Special Types of Forest Inventory   | 5                        | exam                     |
| OB 6.5   | Forest Inventory and Monitoring   | 5                        | exam                     |
| <i>Optional Block 7 "Forest Management in Eastern Europe"</i>                  |   |                          |                          |
| OB 7.1   | Vegetation Fires: Science & Management  | 5                        | exam                     |
| OB 7.2   | Pest Management in Forests of Eastern Europe  | 5                        | exam                     |
| OB 7.3   | Forest ecosystem services   | 5                        | exam                     |
| OB 7.4   | Agroforestry systems, practices and technologies  | 5                        | exam                     |
| OB 7.5   | Impact of natural disturbances on growth and yield  | 5                        | exam                     |
| <b>The total amount of compulsory components</b>                               |   |                          | <b>32</b>                |
| <b>The total amount of optional components</b>                                 |   |                          | <b>33</b>                |
| <b>3. OTHER TYPES OF TRAINING</b>  |   |                          |                          |
| CC 8   | Training practice   | 2                        |                          |
| CC 9   | Production practice   | 18                       |                          |
| CC 10  | Preparation and defense of master's thesis  | 5                        |                          |
| <b>THE TOTAL AMOUNT OF EPP</b>   |   |                          | <b>90</b>                |

## **Annotations of disciplines in the curriculum**

### **1. GENERAL TRAINING CYCLE Compulsory components of EPP**

**Management of Forestry.** 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.

**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.

**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.

**Business foreign language.** Speech Etiquette communication: language models salutation, civility, forgiveness, coordination and more. Linguistic and cultural aspects of international exhibitions. Grammatical and a minimum of linguistic communicative level presentations. Professionally-oriented foreign-language sources. Methods of finding new information in the foreign-language sources. Linguistic methods for analytical processing of foreign sources. The study of foreign language printed original literature and expansion of vocabulary and grammatical skills. Methods and linguistic features of annotation and summarization of foreign sources. Electronic foreign-language sources. Finding information on the Internet by using keywords. Fundamentals of Translation professionally oriented foreign-language sources. Machine translation of large volumes of foreign language information. Lexical minimum computer (information) technology.

**Research Methodology with the basics of intellectual property.** 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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**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".

**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 l / d plants. Planning costs of forest products in market conditions. Financial planning for forest enterprises. Features pricing and their bottom Forestry enterprise.

### Optional components of EPP

#### *Optional Block by 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.

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**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.

**Protection and reproduction of hunting resources.** 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.

#### *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.

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**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.

### *Optional Block 3 "Forest Restoration and Meliorations"*

**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.

**Ecoadaptation forest restorariion.** 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.

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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, 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.

#### *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.

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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.

**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.

**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. 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.

**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.

#### *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.

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**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 creation of plantations for various objects of recultivation. Environmental aspects of biological land reclamation.

*Optional Block 6 "Management of forest resources and forestry business"*

**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.

*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.



**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 | 1,5 years                               |
| – Part-time                                      | 1,5 years                               |
| 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 will be able to work as: junior research worker, planning and organization of public services engineer or specialist, landscape design specialist, park-gardening worker.

***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 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 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 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 and third semesters 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 for Master Theses:**

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 educational program "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>1. GENERAL TRAINING CYCLE</b>                             |  |                   |                   |
| <b>Compulsory components of EPP</b>                          |  |                   |                   |
| CC 1   | Computer design technologies   | 4                 | Exam              |
| CC 2   | Form variety of ornamental plants  | 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>Optional subjects by Student's Choice</i>                 |  |                   |                   |
| OB 1   | Optional subject 1   | 4                 | Exam              |
| OB 2   | Optional subject 2   | 4                 | Exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>              |  |                   |                   |
| <b>Compulsory components of EPP</b>                          |  |                   |                   |
| CC 5   | Landscape planning   | 5                 | Exam              |
| CC 6   | Reconstruction and restoration of landscape-gardening objects  | 4                 | 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  | 4                 | Exam              |
| <b>Optional components of EPP</b>                            |  |                   |                   |
| <i>Optional Block by specialty</i>                           |  |                   |                   |
| <i>Optional Block 1 "Landscape architecture"</i>             |  |                   |                   |
| OB 1.1.  | Landscape design   | 5                 | Exam              |
| OB 1.2.  | Park science   | 5                 | Exam              |
| OB 1.3.  | Conceptual design  | 5                 | Exam              |
| <i>Optional Block 2 "Landscape building"</i>                 |  |                   |                   |
| OB 2.1.  | Vertical planning of landscape objects   | 5                 | Exam              |
| OB 2.2.  | Gardens on artificial grounds  | 5                 | Exam              |
| OB 2.3.  | Phytodesign of interiors   | 5                 | Exam              |
| <i>Optional Block 3 "Ornamental Nursery"</i>                 |  |                   |                   |
| OB 3.1   | Modern technologies in ornamental nursery studies  | 5                 | Exam              |
| OB 3.2   | Potted woody plants growing  | 5                 | Exam              |
| OB 3.3   | Biotechnology methods in decorative nursery  | 5                 | Exam              |
| <i>Optional Block 4 "Ecodesign of the urban environment"</i> |  |                   |                   |
| OB 4.1   | Eco-technology of ornamental horticulture  | 5                 | Exam              |
| OB 4.2   | Organization and service of country-recreation   | 5                 | Exam              |
| OB 4.3   | Protected park science and phytocenology   | 5                 | Exam              |

| Code<br>n/a                                      | Components of the educational program (education<br>disciplines, course projects (paper), practice,<br>qualification work) | Amount of<br>credits | The final<br>control |
|--|--|----------------------|----------------------|
| <b>The total amount of compulsory components</b> |  | 41                   |                      |
| <b>The total amount of optional components</b>   |  | 23                   |                      |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                      |                      |
| CC 11  | Academic Practice  | 18                   |                      |
| CC 12  | Production Practice  | 2                    |                      |
| CC 13  | Preparation and defense of master's thesis   | 6                    |                      |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>            |                      |

### Annotations of disciplines in the curriculum

#### 1. 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.

**Form variety of ornamental plants.** Forms variety of ornamental woody plants - part of dendrology, which studies the culture of woody plants, classification of ornamental qualities, methods of obtaining, biological and ecological features students study the most common and interesting cultures of woody plants and their classification. Upon completion of the discipline, students should be guided in the cultivation of woody plants and have the skills to use in landscaping.

**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.

#### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

##### Compulsory components of EPP

**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.

**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**

*Optional Block by 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 florals.

*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.



## **LAW FACULTY**

**Dean** – Candidate of Science in Law, Associate 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 – Candidate 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

E-mail: interlaw\_chair@twin.nubip.edu.ua

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**

Tel: (044) 259-97-25

E-mail: civillaw\_chair@twin.nubip.edu.ua

Head of the department – Doctor of Law, Associate professor, Pidubnyi Oleksiy Yuriyovych

**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 | 1,5 years                   |
| – Part-time                                      | 1,5 years                   |
| Credits ECTS:                                    |                             |
| – educational and professional program           | 90                          |
| Language of teaching                             | Ukrainian                   |
| Qualification                                    | Master of Law               |

**The concept of training**

Program goal-oriented training of legal experts in law to meet the needs for legal services of the state agricultural sector, including agricultural enterprises of all forms of ownership and legal organizational forms, the sphere of land relations, provision with qualified legal personnel of state organs, public organizations, other enterprises and organizations.

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

***Optional Block "Agrarian Law, Land Law and Environmental Law"***

The program was created based on the state and prospects of development of agricultural science in Ukraine and abroad. The curriculum provides training experts who have deep theoretical base on agrarian, land, environmental and natural resource law, and also be able to apply modern legal techniques for basic and applied research in law. Training oriented in-depth mastery of academic knowledge and skills of their application in practice.

**Areas of employment for graduates**

The program of training for lawyers of agrarian direction provides for personnel needs of Agro-industrial complex and rural social sphere. The level of training and qualifications of graduates gives them the opportunity to work as a lawyer in various economic entities in AIC, in the state executive authorities, local government bodies, relevant departments and offices that exercise powers concerning implementation of state agricultural policy. The program also provides adequate training of future researchers, namely: a graduate student, a teaching assistant, a senior lecturer, a researcher.

***Optional Block "Administrative law"***

Programme getting and deepening students scientific knowledge of administrative and legal activities of state executive, practical skills application of the law in this area, monitor its compliance and familiarization with the organization of public institutions and development of draft regulations on legal support of state executive bodies.

**Areas of employment for graduates**

Prepared within specialization legal professionals have the opportunity to work on a specialty in public administration of Ukraine (public authorities and bodies of local

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government), as well as enterprises, institutions and organizations. The level of training and qualifications enable students to work on teaching positions in research institutes, graduates are entitled to continue postgraduate study.

### ***Optional Block "International Law"***

The program provides theoretical, practical and scientific training of qualified personnel who would have acquired in-depth knowledge to perform professional tasks of research and practical character in international law. Studying Master's program students acquire knowledge of international law, foreign relations, international economic law, international humanitarian law, international legal regulation of food security. Special attention while studying the disciplines is given to the analysis of law of international organizations and international treaty law.

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

The program of training lawyers in the field of international law ensures the need for personnel of the enterprise, institutions and organizations that carry out diplomatic and foreign economic activities and represent the state in the field of international relations and international trade. The level of training and qualification of graduates gives them the opportunity to work in positions of legal advisers in the different subjects of foreign economic activity, the public authorities in the country, bodies representing the State abroad, diplomatic and trade missions, the relevant departments and offices of the Ministry of Economic Development and Trade of Ukraine. The program also provides proper training for future researchers, namely: a graduate student, an assistant of the department, a senior teacher, a research assistant.

### ***Optional Block "Business Law"***

The program provides an opportunity in the current economic conditions to prepare skilled workers for various sectors of agriculture includes both training and the ability to plan litigation legal work, interaction with regulatory authorities, specific contractual relations in certain sectors of the economy and the appropriate legal protection of the rights and legitimate interests of economic subjects object.

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

The level of training and qualification of graduates gives them the opportunity to work as a lawyer in various business entities in state executive power bodies, relevant departments and offices of the Ministry of Justice of Ukraine. The program provides both proper training of future scientists, namely graduate student assistant, senior lecturer, researcher.

### **Practical training**

The aim of the practice is obtaining by the master students of practical skills in agriculture, agricultural production and environmental management. The difficulty lies not only in the problems of application of the imperfect legislation, but, chiefly, in the need to master the many different law provisions of different areas of law, the knowledge of which eventually form a real professional, able to withstand any competition in the legal services market. This knowledge enable practicing lawyers to find an optimal solution of a complex legal problems and achieve its implementation through the competent public authorities.

### **Proposed Topics for Master's Thesis**

1. Rights of sustainable rural development.

2. Rights diversification of agricultural activities.
3. Social development of the village as the Institute of Agricultural Law.
4. Principles of environmental law.
5. The system of environmental law.
6. The subject of environmental law.
7. Legal aspects of the State Land Cadastre.
8. Legal regulation of the state registration of rights to land.
9. Legal aspects of resolving land disputes.

**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>1. GENERAL TRAINING CYCLE</b>                                       |  |                   |                   |
| <b>Compulsory components of EPP</b>                                    |  |                   |                   |
| CC 1   | Philosophy of Law  | 4                 | Exam              |
| CC 2   | Patent law   | 4                 | Exam              |
| CC 3   | International legal regulation of food security  | 4                 | Exam              |
| CC 4   | Environmental policy and EU law  | 4                 | Exam              |
| CC 5   | Problems of Information Law  | 4                 | Exam              |
| CC 6   | Legal technique  | 4                 | Exam              |
| CC 7   | The problems of ownership  | 4                 | Exam              |
| CC 8   | Theoretical issues of civil law  | 4                 | Exam              |
| CC 9   | Current issues preventing and combating corruption in Ukraine  | 4                 | Exam              |
| CC 10  | Current problems of natural resource law   | 4                 | Exam              |
| CC 11  | The law on environmental safety  | 4                 | Exam              |
| CC 12  | Foreign language for specific purposes   | 4                 | Exam              |
| <b>Optional components of EPP</b>                                      |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>                           |  |                   |                   |
| OB 1   | Discipline 1   | 4                 | Exam              |
| OB 2   | Discipline 2   | 4                 | Exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                        |  |                   |                   |
| <b>Compulsory components of EPP</b>                                    |  |                   |                   |
| CC 13  | Advisory activities of a lawyer  | 4                 | Exam              |
| <b>Optional components of EPP</b>                                      |  |                   |                   |
| <i>Optional Block by specialty</i>                                     |  |                   |                   |
| <i>Optional Block 1 "Agrarian Law, Land Law and Environmental Law"</i> |  |                   |                   |
| OB 1.1   | The agrarian law of foreign countries  | 5                 | Exam              |
| OB 1.2   | International and European environmental law   | 5                 | Exam              |
| OB 1.3   | Legal problems acquisition and sale of land rights   | 5                 | Exam              |
| OB 1.4   | The legal regulation of the land market  | 5                 | Exam              |
| <i>Optional Block 2 "Administrative law"</i>                           |  |                   |                   |
| OB 2.1   | Administrative law and administrative responsibility   | 5                 | Exam              |
| OB 2.2   | Administrative jurisdiction in the agricultural sector   | 5                 | Exam              |
| OB 2.3   | Problems and consideration of criminal cases   | 5                 | Exam              |
| OB 2.4   | Judicial and law enforcement agencies of modern Ukraine  | 5                 | Exam              |
| <i>Optional Block 3 "International Law"</i>                            |  |                   |                   |
| OB 3.1   | International humanitarian law   | 5                 | Exam              |
| OB 3.2   | International treaty law   | 5                 | Exam              |
| OB 3.3   | Comparative constitutional law   | 5                 | Exam              |
| OB 3.4   | International economic law   | 5                 | Exam              |
| <i>Optional Block 4 "Business Law"</i>                                 |  |                   |                   |

| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control          |
|--|--|-------------------|----------------------------|
| OB 4.1   | Contract law   | 5                 | Exam                       |
| OB 4.2   | Problems of economic justice   | 5                 | Exam                       |
| OB 4.3   | Competition law  | 5                 | Exam                       |
| OB 4.4   | Legal protection of intellectual property rights   | 5                 | Exam                       |
| <b>The total amount of compulsory components</b> |  | <b>52</b>         |                            |
| <b>The total amount of optional components</b>   |  | <b>28</b>         |                            |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                            |
| CC 14  | Academic Practice  | 1                 | Exam                       |
| CC 15  | Production Practice  | 4                 | Exam                       |
| CC 16  | Preparation and defense of master's work   | 5                 | Defense of master's thesis |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                            |

## Annotations of disciplines in the curriculum

### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Philosophy of Law.** The philosophy of law is a specific sphere of the theoretic legal knowledge which borders on such philosophy branches as ethics, ontology, anthropology, axiology, epistemology etc. The purpose of the "Philosophy of law" academic discipline is to explore the philosophic principles of the legal science and practice of law, to deepen knowledge of the legal sciences as to the conditions of the future professional law enforcement and compliance activities.

**Patent law.** Patent law is an important intellectual property law institute. The objects of legal relations regulated by the patent law are the results of scientific and technical creativity, useful models, inventions and industrial designs.

**International legal regulation of food security.** The main purpose of this discipline is to obtain knowledge about: the concept, the essence, the main characteristics of the international legal food security, sources of international law in the field of food security, international legal regulation of food safety within the UN and its specialized agencies, international regulation of food safety within the World trade Organization. Special attention is paid to international legal regulation of food security at regional level, including legal regulation of food security in the EU.

**Environmental policy and EU law.** One of the promising areas of the European Union's activities is environmental policy. Today, the environmental activity of the European Union is not limited to the introduction of environmental restrictions of economic activity, but aims at creating their own specific instruments and mechanisms for environmental protection.

**Problems of Information Law.** Introducing students to the concept of information relations in society, which are the subject of legal regulation. Highlights of the determination information law as a science, its tasks and place in the law, the formation history of the industry and its individual institutions, but also includes issues of theoretical concepts of information law and information law of foreign countries.

**Legal technique.** The legal technicality is a set of legal and technical rules, procedures, means and methods of the implementation by the authorized entities of presentation of the state's rule-making will with the purpose of efficiently regulating and guarding social relations and ensuring system links of regulatory legal acts of different legal force.

**Theoretical issues of civil law.** The academic discipline involves learning of legal regulations, which have some positive features and direct the state efforts to meeting

customer needs, providing conditions for the development of entrepreneurship, diligence, business and creative initiative, development of legal civil society where a person with dignity will feel independent.

**Current issues preventing and combating corruption in Ukraine.** Familiarizing students with the modern paradigm of public policies to prevent corruption legal framework of public policies on prevention of corruption, international legal and regulatory acts applicable law system in combating and preventing corruption, effective international experience in combating and preventing corruption system of counteraction and prevention of corruption, their functions and powers, novellas national legislation to combat and prevent corruption, with the implementation of anti-corruption reform and so on.

**Current problems of natural resource law.** Issues to be studied: doctrinal approaches concerning the development of the areas of natural-resource law. Natural resources as complex subjects of the legal regulation. Ecological-legal nature of the objects of natural-resource legal relationships in the process of their implementation: the problem of conflicts overcoming. Problems of further integration of the areas of natural resource of law.

**The law on environmental safety.** Issues to be studied: the scientific and legal basis of environmental security provision; subject, technique, principles, system and source of law on environmental safety; mechanism for legal provision of environmental safety; liability as a guarantee of environmental safety; legal principles of environmental safety provision in industry; legal principles of environmental security provision on transport; legal principles of environmental security provision in agriculture; legal principles of environmental security provision in the field of waste handling; legal provision of environmental security in the production and sale of food products; legal principles of environmental security provision in genetic engineering activities; legal principles of environmental security provision when locating and development of human settlements; legal principles of environmental security provision in the use of nuclear energy; legal regime of zones of environmental emergency and guarantee of the realization of rights by victims.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Advisory activities of a lawyer.** Familiarizing students with modern advocacy organization, theoretical knowledge and practical skills of counseling relationships, customer. Application of this knowledge in practical work.

### Optional components of EPP

#### *Optional Block by specialty*

#### *Optional Block 1 "Agrarian Law, Environmental Law and Land Law "*

**The agrarian law of foreign countries.** The purpose and objectives of the course "Agrarian Law of foreign countries" are building knowledge of legal regulation of agrarian relations in foreign countries. Special attention is devoted to the experience of agro-regulation in Russia and Belarus and the EU.

**International and European environmental law.** Issues to be studied: the major global environmental problems; the concepts of international environmental law, its formation and development, sources, principles, codification issues; The concept of environmental safety and sustainable development; international legal protection of environmental rights of a human; institutional mechanism of international environmental law; liability in international environmental law; environmental protection during armed



conflicts; international regulation of handling with hazardous to environment materials and substances; international legal protection of marine and freshwater environment.

**Legal problems acquisition and sale of land rights.** Discipline aimed at forming students appropriate knowledge in the field of theoretical principles of legal support of land rights and legal issues of purchase and sale of land ownership and land use rights, improving security of land rights and features of legal liability offense for land and formation of students practical skills for independent problem solving related to the acquisition and sale of land rights.

**The legal regulation of the land market.** Discipline aimed at forming students adequate knowledge about the legal nature of the land market, legal, institutional and functional aspects of the software market circulation of land, regulation concluding civil contracts for the alienation of land, land sales on a competitive basis, legal basis for forming market of agricultural land.

#### *Optional Block 2 "Administrative law"*

**Administrative jurisdiction in the agricultural sector.** Provides students acquiring knowledge about the legal framework of inspection bodies in agriculture, their system, types, structure and powers of each inspection, especially administrative proceedings for offenses in the field of agriculture.

**Administrative law and administrative responsibility.** Familiarizing students with knowledge on legal ensuring the rights, freedoms and interests of citizens in relation to administrative - jurisdictional authorities and courts, students master the basic assumptions of the theory of administrative law, the Constitution of Ukraine, laws and other normative - legal acts, implementation of theoretical knowledge in practice.

**Problems and consideration of criminal cases.** Familiarizing students with theoretical and practical applied problems of criminal legal qualification and solutions in the theory of criminal law, law enforcement practice and legislation.

**Modern problems of the judicial system in Ukraine.** Familiarizing students with the modern challenges of ensuring the right to a fair trial in Ukraine, organization and functioning of the judicial system of Ukraine, possible prospects of the judicial system and status of judges.

**Judicial and law-enforcement bodies of modern Ukraine.** Introducing students to the subject of discipline, which is the study of information on the regulatory framework, organization, tasks, functions, authority and main activities of state bodies which carry out law enforcement and not the state organization enable the law enforcement functions of the state.

#### *Optional Block 3 "International Law"*

**International humanitarian law.** The concept and history of the formation of international humanitarian law. Sources and principles of international humanitarian law. Concept and types of armed conflicts. Stages of the war. Armed conflicts of an international and non-international character. Parties in the international armed conflict. The concept and conditions of the "humanitarian intervention". The legal status of persons in armed conflict. The regime of military captivity and military occupation. Means and methods of warfare. Protection of civilian objects and cultural values in armed conflicts. Responsibility for crimes and offenses in the field of international humanitarian law. International legal means of protection of human rights in the field of international humanitarian law.

**Law of external relations.** External relations and international relations. Diplomacy and international law as the main regulator of international relations. Law of external relations as brunch of international law. Internal organization of activities in the field of

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external relations. Diplomatic relations and other means of implementation of external relations in the aspect of international legal recognition. Structure and personnel of diplomatic missions. Functions of diplomatic missions and means of their implementation. The concept and history of diplomatic privileges and immunities. Theoretical justification and regulatory support of privileges and immunities in international relations. The legal nature of privileges and immunities. Persons who use international protection. Privileges and immunities as permanent diplomatic missions of the sending state. Privileges and immunities of the staff of permanent diplomatic mission.

**The law of international organizations.** The main objective of the discipline is mastering by students a wide range of concepts and ideas about the complex process of formation and development of international structures, deepening integration interaction between states, new international alliances as a source of stability and peace.

**International economic law.** Definition and sources of international economic law. Subjects of international economic law. Economic integration of states and international economic law. Settlement of disputes in international economic relations. Legal regulation of foreign economic activity in Ukraine. International trade and finance. International investment law and international legal regulation of scientific and technical cooperation.

*Optional Block 4 "Business Law"*

**Contract law.** In studying contract law students gain practical skills in drafting contracts; learn specific techniques protect the business interests of the company by entering into agreements of special conditions on liability, penalties, fines and penalties credits; correct statement of rights and responsibilities of the parties to the treaty.

**Problems of economic justice.** The purpose of discipline "Problems of economic justice" - a generalization of judicial practice of different categories of economic affairs; study features of application of procedural rules, the stages of the trial; application of precedents for similar cases, in particular as the basis for an appeal, and cassation repeated appeal court decisions.

**Competition law.** The purpose of discipline is indicated formation of special legal knowledge in the field of unfair competition and monopoly entity in the market; order and reasons of anti-dumping investigations; application of antitrust sanctions.

**Legal protection of intellectual property rights.** The purpose of discipline is to acquire skills to solve the legal problem: innovative business sector, research and development firms, and concert producer's agencies; representation of individual professional artists and inventors

## **FACULTY OF LAND MANAGEMENT**

**Dean** – Ph.D., Associate Professor, Ievsiukov Taras Oleksiyovych

Tel.: (044) 258-05-25 (24)

E-mail: ievsiukov\_t@nubip.edu.ua

Location: Building № 6, Room 219

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: v\_zayats@ukr.net

Head of Department – Doctor of Economics, Professor Zayats Viktor Mefodiyovych

#### **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

**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 | 1,5 years   |
| – Part-time                                      | 1,5 years   |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of teaching                             | Ukrainian, English                                  |
| Qualification                                    | Master of Science in Geodesy<br>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.

***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 for Master 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.

**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>1. GENERAL TRAINING CYCLE</b>                          |  |                   |                      |
| <b>Compulsory components of EPP</b>                       |  |                   |                      |
| CC 1  | State Examination of Land Management Decisions   | 3                 | Credit               |
| CC 2  | Agricultural, Land and Environmental Law   | 3                 | Credit               |
| CC 3  | Land ownership (real estate) taxation  | 3                 | Credit               |
| CC 4  | Legal Process in Land Management   | 5                 | Exam                 |
| CC 5  | Land and Real Estate Market  | 4                 | Credit               |
| CC 6  | Organization of Land Surveying Works   | 3                 | Exam                 |
| CC 7  | Information Technology and Patenting in Research   | 5                 | Credit               |
| CC 8  | Methodology and Organization of Scientific Research on the Basics of Intellectual Property                           | 3                 | Credit               |
| CC 9  | Economics of Land Use and Land Management  | 4                 | Exam                 |
| <b>Optional components of EPP</b>                         |  |                   |                      |
| <i>Optional subjects by Student's Choice</i>              |  |                   |                      |
| OB 1  | Optional subject 1   | 5                 | Exam                 |
| OB 2  | Optional subject 2   | 3                 | Credit               |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>           |  |                   |                      |
| <b>Compulsory components of EPP</b>                       |  |                   |                      |
| CC 10   | Land Resources Management  | 4                 | Exam, course project |
| CC 11   | Land Monitoring and Conservation   | 6                 | Exam                 |
| CC 12   | Design Engineering   | 6                 | Exam, course project |
| CC 13   | Institutional Supply of Real Estate Cadastre Development   | 4                 | Exam                 |
| CC 14   | GIS in Cadastral Systems   | 4                 | Exam                 |
| <b>Optional components of EPP</b>                         |  |                   |                      |
| <i>Optional Block by specialty</i>                        |  |                   |                      |
| <i>Optional Block 1 "Land Management and Cadastre"</i>    |  |                   |                      |
| OB 2.1  | Technologies of Automated Planning in Land Management  | 4                 | Exam                 |
|   | Territorial planning and Spatial Development   | 4                 | Exam                 |
|   | Management of Quality of Land Surveying Works  | 4                 | Exam                 |
|   | Standardization and Norming in Land Management   | 4                 | Exam                 |
| <i>Optional Block 2 "Land Conservation"</i>               |  |                   |                      |
| OB 2.2  | Formation of agrolandscapes  | 4                 | Exam                 |
|   | Evaluation and Forecast of Land Quality  | 4                 | Exam                 |
|   | Engineering and Technological Reglamentation of Land Conservation  | 4                 | Exam                 |
|   | Forecasting the use of land resources  | 4                 | Exam                 |
| <i>Optional Block 3. "GIS in land management"</i>         |  |                   |                      |
| OB 2.3  | Information Modeling and Programming   | 4                 | Exam                 |
|   | Methods of Remote Sensing  | 4                 | Exam                 |
|   | Geoinformation analysis and modeling   | 4                 | Exam                 |
|   | Integration of GIS, RS and GNSS in Geosystem Monitoring  | 4                 | Exam                 |
| <i>Optional Block 4 "Evaluation of Land and Property"</i> |  |                   |                      |



| 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  | Information Supply of Monetary Land Evaluation   | 4                 | Exam                  |
|   | Land Ownership Rights Registration   | 4                 | Exam                  |
|   | Cadastral of Natural Resources (Institutional Support of Cadastral)  | 4                 | Exam                  |
|   | Valuation of Land and Real Estate  | 4                 | Exam                  |
| <i>Optional Block 5 "Geodetic-Cartographic Technologies in Land Management"</i> |  |                   |                       |
| OB 2.5  | Computer Technologies in Cartography   | 4                 | Exam                  |
|   | National Spatial Data Infrastructure   | 4                 | Exam                  |
|   | Topographic, Geodetic and Cartographic Supply of Land Management   | 4                 | Exam                  |
|   | Natural Resource Mapping   | 4                 | Exam                  |
| <b>The total amount of compulsory components</b>                                |  | <b>57</b>         |                       |
| <b>The total amount of optional components</b>                                  |  | <b>24</b>         |                       |
| <b>3. OTHER TYPES OF TRAINING</b>   |  |                   |                       |
| CC 15   | Academic Practice  | 6                 | Differentiated credit |
| CC 16   | Preparation and defense of master's work   | 3                 | Defense of thesis     |
| <b>THE TOTAL AMOUNT OF EPP</b>  |  | <b>90</b>         |                       |

### Annotations of disciplines in the curriculum

#### 1. GENERAL TRAINING CYCLE Compulsory components of ERP

**State expertise of Land Management Decisions.** 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.

**Agricultural, Land and Environmental Law.** The course aims to create a system of knowledge of the legal regulation of agrarian relations in Ukraine, legal support agrarian and land reform, to determine the peculiarities of legal regulation of food and environmental safety, and mechanisms of its implementation.

**Land ownership (real estate) taxation.** Taxes apply to every citizen of Ukraine as a payer who pays them to the budget and receives public benefits. In addition, the system of interconnection of business entities with the state requires a thorough knowledge of tax legislation. Discipline "Land ownership (real estate) taxation" involves the involvement of the theoretical and organizational foundations of the tax system and additional policies, methods of calculation, the procedure for paying direct and inappropriate taxes of legal entities and individuals, the functioning of alternative taxation systems, the activities of control and administration.

**Legal Process in 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.

**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 Land Surveying 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 in 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.

**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.

**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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Land Resources Management** 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.

**Land Monitoring and Conservation.** 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.

**Institutional Supply of Real Estate Cadastre Development.** 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 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

*Optional Block by specialty*

*Optional Block 1 "Land Management and Cadastre"*

**Technologies of Automated Planning in Land Management.** The course involves studying technologies of automation of land management process, the final result

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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 and Norming in Land Management.** 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.

**Engineering Technological Reglamentation of Land Conservation.** Measures system in the field of land protection: regulation and control, protecting land from harmful human impact, improve soil fertility, standardization. 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.

**Forecasting the use of land resources.** The course is designed to help master the theoretical knowledge and practical skills of agroecological research in different soil-climatic zones of the study of the causes of degradation phenomena, assessment of the extent of their distribution and performance measures for their prevention, conducting environmental and agrochemical land evaluation.

*Optional Block 3 "GIS in land management"*

**Information Modeling and Programming.** 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.

**Geoinformation analysis and modeling.** 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 Monetary 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.

**Land Ownership Rights Registration.** 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 (Institutional Support of Cadastres).** 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 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).

**National Spatial 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

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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.

## **FACULTY OF ECONOMICS**

**Dean** – Professor, Doctor of Economics Anatolii Dibrova

Tel.: (044) 527-85-40

E-mail: [economy\\_dean@nubip.edu.ua](mailto:economy_dean@nubip.edu.ua)

Location: Building № 10, Room 301

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

### **Specialties 051 "Economy"**

#### ***Educational programs "Economics of enterprise"***

Guarantor of the educational and professional program – Professor, Doctor of Economics Oleksandr Yermakov

#### ***Educational programs "Applied Economics"***

Guarantor of the educational and professional program – Professor, Doctor of Economics Natalia Vdovenko

Graduating departments:

#### **Enterprise economics named after prof. I.V. Romanenko**

Tel.: (044) 527-81-01

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

Head of Department – Professor, Doctor of Economics Svitlana Rogach

#### **Organization of business and exchange activities**

Tel.: (044) 527-86-60

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

Head of Department – Professor, Doctor of Economics Mykola Ilchuk

#### **Labour Economics and Social Development**

Tel. : ( 044) 527-82-69

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

Head of Department – Professor, Doctor of Economics Oleksandr Yermakov

#### **Global Economy**

Tel. :( 044) 527-86-48

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

Head of Department – Professor, Doctor of Economics Natalia Vdovenko



### **Specialties 071 "Accounting and Taxation"**

#### **Educational programs "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

E-mail: book-keep\_chair@nubip.edu.ua

Head of Department – Professor, Doctor of Economics, Ievheniia Kaliuga

#### **Statistics and economic analysis**

Tel. : ( 044) 527-82-36

E-mail: statistics\_chair@nubip.edu.ua

Head of Department – Professor, Doctor of Economics Inna D. Lazaryshina

### **Specialties 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**

Tel. : ( 044) 527 88 90

E-mail: kafedfin@ukr.net

Head of Department – Professor, Doctor of Economics Nadiia Davidenko

#### **Banking and Insurance**

Tel. : ( 044) 527 88 90

E-mail: banking\_chair@nubip.edu.ua

Head of Department – Professor, Doctor of Economics Lybov Khudoliy

### **Specialties 076 "Entrepreneurship, Trade and Exchange Activities"**

#### **Educational program "Entrepreneurship, Trade and Exchange Activities"**

Guarantor of the educational and professional program – Professor, Ph.D. in Economics Mykola Solodky

Graduating department:

#### **Organization of business and exchange activities**

Tel.: (044) 527-86-60

E-mail: organizing\_chair@nubip.edu.ua

Head of Department – Professor, Doctor of Economics Mykola Ilchuk

**Training of masters of sciences  
in branch of knowledge "Social and Behavioral Sciences"  
in specialty 051 "ECONOMY"  
in 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 | 1,5 years                     |
| – Part-time                                      | 1,5 years                     |
| 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

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 for Master Theses

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 for Master 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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of specialty</b>       |  |                   |                   |
| CC 1  | Methodology and organization of scientific research  | 5                 | exam              |
| CC 2  | Agricultural policy  | 5                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 3                 | exam              |
| OB 2  | Optional subject 2   | 3                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of specialty</b>       |  |                   |                   |
| CC 3  | Managerial Economics   | 5                 | exam              |
| CC 4  | Project management   | 5                 | exam              |

| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|--|--|-------------------|-------------------|
| CC 5   | Global economy   | 5                 | exam              |
| CC 6   | Modeling in management of production systems   | 5                 | exam              |
| <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              |
| <b>Optional components of EPP</b>  |  |                   |                   |
| <i>Optional Block by specialty</i>   |  |                   |                   |
| OB 2.1   | Optional block 1*  | 5                 | exam              |
| OB 2.2   | Optional block 2*  | 5                 | exam              |
| OB 2.3   | Optional block 3*  | 5                 | exam              |
| OB 2.4   | Optional block 4*  | 5                 | exam              |
| <i>* from the list of elective disciplines of the faculty for specialty 051 Economics of OPP "Economics of the enterprise"</i> |  |                   |                   |
| <b>The total amount of compulsory components</b>   |  | <b>50</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>26</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>  |  |                   |                   |
| CC 11  | Preparation and defense of master's work   | 4                 |                   |
| CC 12  | Internship   | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>   |  | <b>90</b>         |                   |

## Annotations of subjects in the curriculum

### 1. 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.

### 2. 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.

### Optional components of EPP

#### *Optional Block by 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.

**Bioeconomics.** Trends in science and technology that underpin the biosocial economy. Conceptual approaches and methods of analysis of processes of bioeconomy, state of production and sale of products of agricultural and other areas of consumption in accordance with the needs of human society and bioenergy potential of the environment. Formation of bioenergy strategies for sustainable development.

**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, 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.

**Training of masters of sciences  
in branch of knowledge "Social and behavioral sciences"  
in specialty 051 "ECONOMY"  
in educational program "APPLIED ECONOMICS"**

|  |                               |
|--|-------------------------------|
| Form of Training:                                | Licensed number of persons:   |
| – Full-time                                      | 85                            |
| – Part-time                                      | 85                            |
| Duration of Training:                            |                               |
| – Full-time educational and professional program | 1,5 years                     |
| – Part-time                                      | 1,5 years                     |
| Credits ECTS:                                    |                               |
| – educational and professional program           | 90                            |
| Language of Teaching                             | Ukrainian, English            |
| Qualification                                    | Master of Economics graduates |

**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 training program**

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.

### Approximate topics of master's work

1. Development of agrarian business in the region and increase its efficiency.
2. Organization and prospects of development of agricultural enterprises.
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 for Master 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>1. GENERAL TRAINING CYCLE</b>   |  |                   |                   |
| <b>Compulsory components of EPP</b>  |  |                   |                   |
| CC 1   | Methodology and organization of scientific research  | 5                 | exam              |
| CC 2   | Agricultural policy  | 5                 | exam              |
| <b>Optional components of EPP</b>  |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>   |  |                   |                   |
| OB 1   | Optional subject 1   | 3                 | exam              |
| OB 2   | Optional subject 2   | 3                 | exam              |
| <b>2. 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>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              |
| <b>Optional components of EPP</b>  |  |                   |                   |
| <i>Optional Block by specialty</i>   |  |                   |                   |
| OB 2.1   | Optional block 1*  | 5                 | exam              |
| OB 2.2   | Optional block 2*  | 5                 | exam              |
| OB 2.3   | Optional block 3*  | 5                 | exam              |
| OB 2.4   | Optional block 4*  | 5                 | exam              |
| <i>* from the list of elective disciplines of the faculty for specialty 051 Economics of OPP "Applied Economics"</i> |  |                   |                   |
| <b>The total amount of compulsory components</b>   |  | <b>50</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>26</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>  |  |                   |                   |
| CC 11  | Preparation and defense of master's work   | 4                 |                   |
| CC 12  | Internship   | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>   |  | <b>90</b>         |                   |

## Annotations of subjects in the curriculum

### 1. 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.

### 2. 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**

*Optional Block by 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.

**Training of masters of sciences  
field of knowledge "Management and Administration"  
in specialty 071 "ACCOUNTING AND TAXATION"  
in 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 | 1,5 years                                  |
| – Part-time                                      | 1,5 years                                  |
| 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 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 for Master Theses**

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.

**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>1. 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>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>     |  |                   |                   |
| OB 1   | Optional subject 1   | 3                 | exam              |
| OB 2   | Optional subject 2   | 3                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components of specialty</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              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional Block by specialty</i>               |  |                   |                   |
| <i>Optional Block 1</i>                          |  |                   |                   |
| OB 1.1   | Internal control of agricultural units' activity   | 5                 | exam              |
| OB 1.2   | Business social analysis   | 5                 | exam              |
| OB 1.3   | Public Procurement   | 5                 | exam              |
| OB 1.4   | Applied econometrics   | 5                 | exam              |
| OB 1.5   | Global Economy   | 5                 | exam              |
| <i>Optional Block 2</i>                          |  |                   |                   |
| OB 2.1   | Strategic Management Accounting  | 5                 | exam              |
| OB 2.2   | Forensic economic examination  | 5                 | exam              |
| OB 2.3   | Analytical substantiation of managerial decisions  | 5                 | exam              |
| OB 2.4   | Professional ethics of accountants and auditors  | 5                 | exam              |
| OB 2.5   | Global Economy   | 5                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>50</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>26</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 11  | Preparation and defense of master's work   | 4                 |                   |
| CC 12  | Internship   | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

**Annotations for educational plan disciplines**

**1. 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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of specialty

**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

#### *Optional Block by specialty*

**Internal control of agricultural units' activity.** Control of financial and business control equity and liabilities, control of revenues, expenditures and financial results.

**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.

**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.

**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.

**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.

**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.

**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.

**Professional ethics accountant and auditors.** 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.

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**Training of masters of sciences  
field of knowledge "Management and administration"  
in specialty 072 "FINANCE, BANKING AND INSURANCE"  
in 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 | 1,5 years                                |
| – Part-time                                      | 1,5 years                                |
| 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;

- 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 for Master Theses

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 for Master 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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 1  | Methodology and organization of scientific research  | 5                 | exam              |
| CC 2  | Agricultural policy  | 5                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 3                 | exam              |
| OB 2  | Optional subject 2   | 3                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of specialty</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 9  | Insurance management   | 5                 | exam              |
| CC 10   | Tax management   | 5                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional Block by 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              |
| 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              |

| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|--|--|-------------------|-------------------|
| OB 2.8   | Public Procurement   | 5                 | exam              |
| <b>Total</b>                                     |  | <b>20</b>         |                   |
| <b>The total amount of compulsory components</b> |  | <b>50</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>26</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 11  | Preparation and defense of master's work   | 4                 |                   |
| CC 12  | Internship   | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

### Annotations of subjects in the curriculum

#### 1. 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.

#### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE Compulsory components of specialty

**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**

#### *Optional Block by 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).

**Training of masters of sciences  
field of knowledge "Management and Administration"  
in specialty 076 "ENTREPRENEURSHIP, TRADE AND EXCHANGE ACTIVITIES"  
in educational and professional 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 | 1,5 years  |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of Teaching                             | Ukrainian  |
| Qualification                                    | master of Entrepreneurship,<br>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

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 for Master Theses**

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.

**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>1. 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>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>     |  |                   |                   |
| OB 1   | Optional subject 1   | 3                 | exam              |
| OB 2   | Optional subject 2   | 3                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components of specialty</b>        |  |                   |                   |
| CC 3   | Business Planning entrepreneurship in agriculture  | 5                 | exam              |
| CC 4   | Exchange market  | 5                 | exam              |
| CC 5   | Pricing in the exchange market   | 5                 | exam              |
| CC 6   | Analysis and forecasting the stock market  | 5                 | exam              |
| CC 7   | Competitiveness business structures  | 5                 | exam              |
| CC 8   | Business project management  | 5                 | exam              |
| CC 9   | Corporate social responsibility  | 5                 | exam              |
| CC 10  | Commercial activity  | 5                 | exam              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional Block by specialty</i>               |  |                   |                   |
| OB 2.1   | Hedging futures and options  | align="center">5  | іспит             |
|  | International stock markets  |                   |                   |
| OB 2.2   | Economics of production  | align="center">5  | іспит             |
|  | Entrepreneurship in the field of processing of agricultural products   |                   |                   |
| OB 2.3   | E-Business   | align="center">5  | іспит             |
|  | Commercial logistic  |                   |                   |
| OB 2.4   | Public Procurement and Exchange E-trade  | align="center">5  | іспит             |
|  | Global Economy   |                   |                   |
| <b>The total amount of compulsory components</b> |  | <b>50</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>26</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 11  | Preparation and defense of master's work   | 4                 |                   |
| CC 12  | Internship   | 10                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

**Annotations educational plan disciplines**

**1. 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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components by specialty

**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.

**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.

**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.

**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.

**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.

**Corporate Social Responsibility.** Formation of basic knowledge of theory and

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practice of social responsibility of professional competence, learning theoretical principles and practices of cooperation between the state, business, society and the rights of CSR.

**Commercial activities.** The theoretical basis of commercial business; various types of business entities in trade; successive stages of establishing their own business; basics of business planning; the state registration; licensing and patenting; features of entrepreneurial activity in wholesale and retail trade; ethical and responsible business to various groups in society.

### **Optional components of EPP**

#### *Optional Block by 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.

**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.

**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.

**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.

**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 and Exchange E-trade.** Basic Principles of Public Procurement; methodological bases of organization of procurement activity in the

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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. It is provided formation of knowledge and skills of students on introduction of computer technology in the stock market, based on electronic technology exchange trading and use of participants in the exchange market as well.

**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.

## **FACULTY OF AGRICULTURAL MANAGEMENT**

**Dean** - Candidate of economic sciences, professor Anatolii Ostapchuk

Tel .: (044) 527-85-73

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

Location: educational building 10, room 313, 525

Faculty (ERI) organizes and coordinates educational process of master training in educational programs within specialties:

### **Specialty 073 "Management"**

#### ***Educational program "Management of organization and administration"***

Guarantor of the educational and professional program – PhD (Economics), Professor Tetiana Balanovska

#### **The graduating department:**

Department of Management after Pr. Y.S. Zavadskyy

Tel .: (044) 527-84-80

E-mail: kafedrafam.bas@gmail.com

Head of department - Doctor of Economics, Professor Nadiia Reznik

#### ***Educational program "Management of foreign economic activity"***

Guarantor of the educational and professional program - Doctor of Economics, professor Valerii Halushko

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 Tetiana Mostenska

#### ***Educational program "Administrative Management"***

Guarantor of the educational and professional program - professional program is Olena Kovtun, Candidate of Economic sciences, Associate Professor

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 Tetiana Mostenska

***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)

Head of Department – Corresponding Member of the National Academy of sciences of Ukraine, Professor, Doctor of Economics Lidiia Shynkaruk

**Specialty 075 "Marketing"**

***Educational program "Marketing"***

Guarantor of the educational and professional program - Doctor of Economics, professor Ruslan Buriak

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

**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                                      | 60   |
| – part-time                                      | 50   |
| Duration of training                             |  |
| – full-time educational and professional program | 1,5 year   |
| – part-time                                      | 1,5 year   |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of teaching                             | Ukrainian  |
| Qualification of graduates                       | master degree in management of organization and administration, manager (administrator) of an 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, willingness to work in a dynamic highly competitive environment.

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

***Optional block "Management of economic security of the organization"***

Training of specialists to build and maintain the management system and economic security of organizations and their departments, taking into account the goals and information policy in the field of security, methodology for determining and analyzing indicators economic security of the organization, the processes of economic security. Graduates who choose this block of disciplines will have the knowledge and skills to improve the efficiency of their organizations or their divisions, using modern approaches to assessing the potential enterprise development and risk management and economic security.

***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.

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### **Employment of graduates**

The graduate is suitable for employment in the following positions:

- heads of enterprises, institutions and organizations(CEO);
- 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.

### **Focused topics of master's theses**

1. Introduction of modern technologies of personnel management.
2. Work motivation, improving the efficiency of the enterprise (organization, institution).
3. Management of enterprise competitiveness.
4. Leadership in the management system of an agricultural enterprise.
5. Information support for the functioning of the organization (for example...).
6. Marketing management in the enterprise.
7. Management of increasing the investment attractiveness of the enterprise (for example...).
8. Features of management of holding companies.
9. Organization of crisis management of the enterprise at different stages of its life cycle (based on materials...).
10. Integrated quality management systems.
11. Risk management in the enterprise.
12. Image formation of the organization (based on...).
13. Socio-psychological methods in the management of enterprises.
14. Formation a system of effective corporate governance.
15. Corporate culture as a factor in the effectiveness of modern enterprise management.



**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>1. GENERAL TRAINING CYCLE</b>   |  |                   |                   |
| <b>Compulsory components of EPP</b>  |  |                   |                   |
| CC 1   | Business management  | 4                 | exam              |
| CC 2   | Psychology of management and conflictology   | 4                 | exam              |
| CC 3   | Business ethics and corporate social responsibility  | 4                 | exam              |
| CC 4   | Change management  | 4                 | exam              |
| CC 5   | Methodology of scientific research   | 4                 | exam              |
| <b>Optional components of EPP</b>  |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>   |  |                   |                   |
| OB 1   | Optional discipline 1  | 4                 | exam              |
| OB 2   | Optional discipline 2  | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components of EPP</b>  |  |                   |                   |
| CC 6   | Management of enterprise competitiveness   | 4                 | exam              |
| CC 7   | Contract law   | 4                 | exam              |
| CC 8   | Corporate management   | 4                 | exam              |
| CC 9   | Project management in organizations  | 4                 | exam              |
| CC 10  | Quality management   | 4                 | exam              |
| <b>Optional components of EPP</b>  |  |                   |                   |
| <i>Optional Block for Choice of Specialty</i>  |  |                   |                   |
| <i>Optional Block 1 "Management of economic security of the organization"</i>              |  |                   |                   |
| OB 1.1   | SMART-technologies in management   | 4                 | exam              |
| OB 1.2   | Risk Management and Economic Security  | 4                 | exam              |
| OB 1.3   | Diagnostics in the management system   | 4                 | exam              |
| OB 1.4   | Public Procurement Management  | 4                 | exam              |
| <i>Optional Block 2 "Management in various organizational and legal forms of business"</i> |  |                   |                   |
| OB 2.1   | Digital Management   | 4                 | exam              |
| OB 2.2   | Complex quality management system of products and services   | 4                 | exam              |
| OB 2.3   | Management of organizational development of the enterprise   | 4                 | exam              |
| OB 2.4   | Management of cooperatives   | 4                 | exam              |
| <b>The total amount of compulsory components</b>   |  | <b>40</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>  |  |                   |                   |
| CC 11  | Practical training   | 12                |                   |
| CC 12  | Writing and defense of master thesis   | 14                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>   |  | <b>90</b>         |                   |

**Annotations of subjects in the curriculum**

**1. CYCLE OF GENERAL TRAINING  
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 and conflictology.** Theoretical approaches and results of practical research in the field of management psychology and conflict studies. Methods of psychodiagnostics in working with individual employees and their groups in the team. Psychological features of employee behaviour 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 on the basis of corporate social responsibility. Strategy of socially responsible behavior in the market environment. Evaluation of the effectiveness of corporate social responsibility.

**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. Practical application of the theory and methodology of change in enterprises, overcoming resistance to change and structural change.

**Methodology of scientific research.** 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.

## 2. 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. Fulfilment 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.

**Corporate governance.** The essence and economic nature of corporate governance. Varieties of corporate associations as objects of corporate governance. Joint-stock company as an object of corporate governance. External environment of corporate governance. Corporate capital management. Development of corporate governance. Corporate control. Corporate culture.

**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.

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Project planning in time. Project calendar planning. Project implementation control. Project content management. Creating a hierarchical structure of works. The essence of project subject area management. 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**

#### *Optional Block by specialty*

#### *Optional Block 1 "Management of economic security of the enterprise"*

**SMART-technologies in management.** The essence of the smart category and its features from a managerial point of view. SMART-technologies in management and its specifics. Strategic state smart-management of regions. World experience in using smart technologies at the municipal level. Using of block chain technologies in the field of public procurement. Smart Factory as a smart production. Performance Management as a technology to increase the effectiveness of staff activities. Assessment Center technology and its application in the evaluation of employees. Evaluation of employees' activity according to the Hay Group method. Intellectual property protection based on smart contracts.

**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.

**Diagnostics in the management system.** The essence and role of diagnostics in the enterprise management system. Diagnostics of the enterprise competitiveness and its products. Property diagnostics and market value of products. Management Diagnostics. Diagnostics of the production potential of the enterprise. Financial diagnostics. Diagnostics of the enterprise economic security. Diagnostics of corporate culture of the enterprise.

**Public Procurement Management.** The concept and importance of public procurement. Procurement organization concept. Examples of attributing an enterprise to the "customer". Procurement cycle and implementation process. Exclusion from procurement procedures. Special rules for personal areas of activity. Procurement entities. Procurement planning and reporting. Types and descriptions of procedures, examples of application of each of them. Preparation and approval of tender documentation. Technical specifications. Typical errors / violations in the preparation of tender documents. Prevention of restriction of competition and discrimination of participants. Communication

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between the customer and the participants. Disclosure and evaluation of proposals, determination of the winner and conclusion of the contract. Ensuring the offer and execution of the procurement contract. General characteristics of the appeal institute in the field of procurement. The concept of the procurement contract. Cases when it is allowed to make changes to the terms of the procurement contract.

*Optional block 2 "Management in various organizational and legal forms of business"*

**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.

**Management of organizational development of the enterprise.** Theoretical bases of organizational development of various organizational formations. Change management as a basis for organizational development of enterprises. Factors of organizational development in the context of globalization and economic transformation. Methodological principles of organizational development management. Conceptual principles of organizational development management, implementation of innovative technologies in enterprise management, professional development of managerial staff. Practical aspects of organizational development management, organizational development strategies as a basis for enterprise competitiveness.

**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.

**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty "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 | 1,5 year  |
| – part-time                                      | 1,5 year  |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of teaching                             | Ukrainian, English  |
| Qualification of graduates                       | master degree in management of<br>foreign economic activity,<br>manager (administrator) of foreign<br>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**

***Optional Block "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.

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

Management of structural subdivisions of transnational companies, joint and foreign enterprises, enterprises and structural subdivisions of domestic enterprises engaged in foreign economic activity

### ***Optional Block "Customs Management"***

Provides a combination of the study of business disciplines and disciplines that determine the acquisition of master's skills in customs management. In addition to basic knowledge in the field of foreign economic activity, graduates will have the skills of market analysis, decision making, project activities. In addition, graduates will gain knowledge about customs policy, the peculiarities of the planning, organization and conduct of customs activities. Graduates will be prepared for activities that provide in-depth knowledge of customs regulation, customs rules and procedures.

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

Management of structural subdivisions of international enterprises and subdivisions of domestic enterprises engaged in foreign economic activity,

### **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 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.

### **Approximate topics of master's theses**

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 economic 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 in the context of globalization of the world economy.
10. Competition in world markets for agricultural products.
11. Organization of customs logistics of the enterprise-participant of FEA
12. Management of customs operations of the enterprise-subject of foreign economic activity.



**Master's curriculum  
under the educational program "Management of foreign economic activity"  
(educational and professional training program)**

| Code n/a   | Components of the educational-professional program<br>(academic disciplines, course projects (works), practices,<br>qualification work)                        | Number<br>loans | Form final<br>control |
|--|--|-----------------|-----------------------|
| 1. GENERAL TRAINING CYCLE                                  |  |                 |                       |
| Compulsory components of EPP                               |  |                 |                       |
| CC 1   | World Commodity Markets (Module 1. World Agriculture; Module 2. International Markets for Goods and Services)  | 8               | exam                  |
| CC 2   | FEA management   | 6               | exam                  |
| CC 3   | Business strategies in marketing activities  | 3               | exam                  |
| CC 4   | State regulation of foreign economic activity (Module 1. State regulation of foreign economic activity. Module 2. Illegalization of foreign economic activity) | 7               | exam                  |
| CC 5   | International credit and settlement and currency transactions  | 4               | exam                  |
| CC 6   | Critical thinking and risk management in foreign trade   | 3               | exam                  |
| CC 7   | Management of international competitiveness of the enterprise  | 3               | exam                  |
| Optional components of EPP                                 |  |                 |                       |
| Optional Components of free Students Choice                |  |                 |                       |
| OS 1   | Optional subject 1   | 4               | exam                  |
| OS 2   | Optional subject 2   | 4               | exam                  |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE                   |  |                 |                       |
| Compulsory components of EPP                               |  |                 |                       |
| CC 8   | Business protocol and negotiations   | 4               | exam                  |
| CC 9   | Seminar on preparation and writing of master's thesis  | 3               | exam                  |
| CC 10  | Business design in an international environment  | 4               | exam                  |
| CC 11  | Cross-cultural management  | 4               | exam                  |
| Optional components of EPP                                 |  |                 |                       |
| Optional Block by specialty                                |  |                 |                       |
| Optional Block 1 "Management of foreign economic activity" |  |                 |                       |
| OB 1.1   | Management of international business   | 5               | exam                  |
| OB 1.2   | TNCs in a global environment   | 3               | exam                  |
| OB 1.3   | Logistics in foreign trade   | 3               | exam                  |
| OB 1.4   | Organizational behavior and leadership   | 3               | exam                  |
| OB 1.5   | Monitoring and evaluation of performance (Key management indicators)   | 3               | exam                  |
| Optional Block 2 "Customs Management"                      |  |                 |                       |
| OB 2.1   | Customs logistics  | 3               | exam                  |
| OB 2.2   | Customs regulation   | 3               | exam                  |
| OB 2.3   | Customs management   | 5               | exam                  |
| OB 2.4   | Organizational behavior and leadership   | 3               | exam                  |
| OB 2.5   | Monitoring and evaluation of performance (Key management indicators)   | 3               | exam                  |
| The total amount of mandatory components                   |  | 45              |                       |
| The total amount of sample components                      |  | 25              |                       |
| 3. OTHER TYPES OF TRAINING                                 |  |                 |                       |
| CC 12  | Practical training   | 9               | Credit                |
| CC 13  | Preparation and defense of master's theses   | 11              | MR protection         |
| TOTAL VOLUME OF EPP  |  | 90              |                       |

## Annotations of subjects in the curriculum

### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**World commodity markets.** *Module 1. World agriculture and food resources.* The objectives of the discipline "World Agriculture and Food Resources" are: to teach students the laws of world agriculture, to provide future professionals with systematic and consistent knowledge about the economy of agriculture in some countries and regions in the development of agricultural production and international relations. The objectives of the discipline are: to form students' knowledge of the main patterns of agricultural development; to teach students to analyze the current state and assess future trends in the industry on a global scale, to determine the level of development of the agricultural economy of individual countries, to use methods and foreign experience to solve the problems of the agricultural economy of Ukraine.

*Module 2. International markets for goods and services.* Study of the world market as a system of exchange of goods and services, the role of the international division of labor, international monetary and financial relations in the formation of international markets. Functional and organizational features of the international market of goods and services. History of origin, evolution and main tendencies of modern development of the international market of goods and services, place of Ukraine on it. Characteristics of the international market of goods and services: international division of labor; economic separation of subjects in a special national-economic form of commodity-money nature of relations between them. Subjects and objects of the world market of goods and services.

**Management FEA.** 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.

**Business strategies in marketing activities.** The main purpose of the course is SFto provide students with a system of theoretical knowledge and applied skills in relation to the modern methodological apparatus for solving problems of internationalization of business, 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.

**State regulation of foreign economic activity.** *Module 1. 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 and financial spheres of the economy, areas of effective 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 ability to creatively search for directions and reserves for improvement of foreign economic activity.

*Module 2. Illegalization of foreign economic activity.* Theoretical approaches to the definition of illegalization in the field of foreign economic activity. Minimization of customs

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duties and taxes, receipt of excess profits and removal of financial resources outside the country. Definition of methods of illegalization of foreign economic activity: concealment from official accounting and violation of legislation. Determination of losses of the state and subjects of foreign economic activity from the use of illegalization of foreign economic activity. The role of offshore centers in the implementation of the illegalization of foreign economic activity. Illegalization centers.

**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 operations, which are carried out in servicing the 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 trade.** In the conditions of fast dynamics of market processes management of risks of the enterprise becomes an integral component of effective management. 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 the enterprise.** The purpose of studying the discipline is to provide students with knowledge about the objective laws, real processes and specific features of ensuring 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 of students with the main forms of international trade and investment cooperation; understanding of features, mechanisms, principles and tasks of ensuring international competitiveness; acquaintance of students with features and character of modern competition in the markets of the goods and services, integration processes, a place in them of Ukraine.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of ERP

**Business protocol and negotiation.** The discipline studies modern requirements for management, in particular in such areas, business protocol and ethics as its important component, corporate responsibility - the first step to ethical behavior, preparation for negotiations, introduction of negotiations (main stages and their characteristics), methods of negotiation, styles negotiation, analysis of the results of negotiations and implementation of the agreements reached, rules and regulations of business meetings, the main points of the agreement on a business meeting, preparation of premises and meeting of delegates ii. Study of ethical issues of management and business.

**Seminar on preparation and writing of master's thesis.** The purpose of studying the discipline is to ensuring the quality of master's work. 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,

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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.

**Business design in an international environment.** The modern methodology of business design is considered, the basic stages, approaches and basic tools, methodology of business design are defined, efficiency of the logical-structural approach used by the international organizations at development of projects of development and restructuring is defined. The main purpose of the course is to give students an idea of the methodology of preparation and implementation, ways and means of attracting resources for the implementation of international projects and mechanisms for their management.

**Cross-cultural 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 increase the efficiency of management and the application of knowledge in practice.

### **Optional components of ERP**

*Optional Block by specialty*

#### *Optional Block 1 "Management of foreign economic activity"*

**Management of international business.** 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 numerous options for conducting commercial transactions. Commercial activity in international markets has a number of 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.

**TNCs in a global environment.** One of the main trends in the globalization of these processes is transnationalization, when a significant part of production, consumption, exports, imports, and income of the country largely depends on the activities of TNCs located outside a particular state. 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 trade.** The purpose of the discipline is the formation of systematic theoretical knowledge and the acquisition of practical skills of 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 normative-legal agreements, acts of bilateral agreements and norms of domestic legislation, which establish the order of regulation of transport activity on international transportations; acquaintance of students with the list and forms of transport

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document circulation on foreign economic operations; analysis and substantiation of competencies of state bodies for licensing and certification.

**Organizational behavior and leadership.** The purpose of studying the discipline is: students mastering specific techniques and tools for managing organizational behavior and individual behavior in the organization; formation of skills of effective organizational behavior; acquisition of skills of analysis of individual psychological characteristics of personality, motivation of employees and ensuring effective interaction within the organization, study of group and intergroup dynamics in the organization, planning and organization of effective teamwork; mastering the tools of organizational development management, studying the features of team management and models of effective teamwork, identifying differences in leadership styles and the use of power tools, ensuring the effectiveness of conflict and stress management.

**Monitoring and evaluation of performance (Key management indicators).** The main purpose of teaching the discipline is to form students' competence in basic principles, basic categories, modern concepts, theoretical principles and practical methods of managing the main activities of enterprises and skills to develop operational strategy, create and use industry operating subsystems as a basis for achieving mission.

#### *Optional Block 2 " Customs Management"*

**Customs logistics.** The purpose of studying the discipline is to form students' system knowledge and understanding of the conceptual foundations of customs logistics as a necessary tool for foreign trade operations, acquisition of skills and abilities to effectively manage material flows in the implementation of foreign trade and customs operations. The discipline provides: mastering the theoretical foundations of customs and customs logistics; mastering the methodological foundations of customs logistics; mastering the mechanisms of customs logistics; mastering the theoretical foundations and mechanism of interaction between logistics and customs; understanding of basic concepts and elements of the customs system; understanding of the main components of the customs infrastructure; mastering the theoretical foundations and mechanism of interaction between logistics and customs; mastering the organizational principles of customs logistics at the enterprise; mastering the basics of customs declaration; mastering the principles and methods of the unit responsible for the function of customs logistics.

**Customs regulation.** Discipline is designed to form in students a system of theoretical knowledge of generalized rules and obligations established by states on a contractual basis; norms and principles governing their relations in the field of interstate customs cooperation, as well as to provide applied skills in the use of basic international customs procedures and rules. The objectives of the course are: to acquaint students with the generalized rules and obligations of the world community, norms and principles for regulating relations in the organization of customs control over the movement across their customs borders of objects, goods, individuals, services and capital; to explain the mechanism of establishment and unification of customs tariffs operating in the single customs territories created by the states within the framework of customs unions and customs zones; to teach students the conditions for collecting customs duties and setting the level of customs rates;

**Customs management.** The study of the discipline is based on the study of customs legislation, determining the principles of organization of customs in Ukraine, creating favorable conditions for the development of foreign economic relations, improving the efficiency of foreign economic activity. When studying the discipline, students acquire knowledge to ensure the organization and functioning of the customs system, determining the legal and organizational mechanisms of interaction of its elements; study of general principles of customs relations regulation; protection of economic interests of Ukraine and

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subjects of foreign economic activity; creating conditions for effective fight against smuggling and violations of customs rules, control over foreign exchange transactions; increasing the level of organizational and legal guarantees of the subjects of customs relations, studying the system of responsibility.

**Organizational behavior and leadership.** The purpose of studying the discipline is: students mastering specific techniques and tools for managing organizational behavior and individual behavior in the organization; formation of skills of effective organizational behavior; acquisition of skills of analysis of individual psychological characteristics of personality, motivation of employees and ensuring effective interaction within the organization, study of group and intergroup dynamics in the organization, planning and organization of effective teamwork; mastering the tools of organizational development management, studying the features of team management and models of effective teamwork, identifying differences in leadership styles and the use of power tools, ensuring the effectiveness of conflict and stress management.

**Monitoring and evaluation of performance (Key management indicators).** The main purpose of teaching the discipline is to form students' competence in basic principles, basic categories, modern concepts, theoretical principles and practical methods of managing the main activities of enterprises and skills to develop operational strategy, create and use industry operating subsystems as a basis for achieving mission.



**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 | 1,5 year  |
| – part-time                                      | 1,5 year  |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of teaching                             | Ukrainian, English, German                              |
| Qualification of graduates                       | manager (administrator) in<br>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 is internationally accredited by ACQUIN. Studying for the 1st and 2nd semesters of the first year of study are semesters of international mobility. 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 training program**

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. Training of 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.

### Areas of employment of graduates

Management of enterprises and structural subdivisions of enterprises of agrarian and related spheres of economy, including with foreign investments.

### 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.

### Approximate topics of master's theses

1. Outsourcing of human resources in the enterprise management system.
2. Social aspects of management in agricultural enterprises.
3. Formation of strategies for managing the advertising activities of the enterprise.
4. Management of crop production at the enterprise.
5. Management of organic production in Ukraine.
6. Business career management of the company's staff.
7. Management of innovative activity of the enterprise.
8. Conflict in the context of enterprise management.
9. Product quality management.
10. The system of labor potential management of the enterprise.

### 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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 1  | Business management  | 5                 | exam              |
|   | <i>Business management: basics</i>   | 2.5               |                   |
|   | <i>Business management: business game</i>  | 2.5               |                   |
| CC.2  | Economics of production  | 5                 | exam              |
| CC 3  | Business management and controlling  | 5                 | exam              |
|   | <i>Analysis and control of the enterprise</i>  | 2.5               |                   |
|   | <i>financial management</i>  | 2.5               |                   |
| CC 4  | Methodology of social empirical social research  | 4                 | exam              |
| CC 5  | Business planning (enterprise planning and organization)   | 5                 | exam              |
| CC 6  | Strategies of international agricultural marketing   | 4                 | exam              |
| CC 7  | Business modeling  | 5                 | exam              |
| CC 8  | Strategic management and decision making methods   | 5                 | exam              |
|   | <i>Quantitative methods of decision making</i>   | 2.5               |                   |
|   | <i>Strategic management</i>  | 2.5               |                   |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Agrarian policy  | 4                 | exam              |
| OB 2  | Technology system  | 5                 | exam              |
| <b>2. 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 |
|---|--|-------------------|-------------------|
| Compulsory components of EPP              |  |                   |                   |
| CC 9                                      | Technique of administrative activity   | 4                 | exam              |
| CC 10                                     | Content management of works  | 4                 | exam              |
| CC 11                                     | Seminar on preparation of master's work (introduction to scientific work)  | 3                 | exam              |
| Optional components of EPP                |  |                   |                   |
| Optional Block by specialty               |  |                   |                   |
| Optional Block 1.                         |  |                   |                   |
| OB 1.1                                    | Management consulting  | 4                 | exam              |
| OB 1.2                                    | Team building and personnel management   | 4                 | exam              |
| OB 1.3                                    | Design and management of business processes  | 3                 | exam              |
| OB 1.4                                    | Critical thinking and management decisions   | 3                 | exam              |
| OB 1.5                                    | Cross-cultural management  | 3                 | exam              |
| Optional Block 2.                         |  |                   |                   |
| OB 2.1                                    | Agrotechnological consulting   | 4                 | exam              |
| OB 2.2                                    | The concept of regional development  | 4                 | exam              |
| OB 2.3                                    | Cross-cultural management  | 3                 | exam              |
| OB 2.4                                    | Business Foreign Language  | 3                 | exam              |
| OB 2.5                                    | Legal bases of administrative activity   | 3                 | exam              |
| The total amount of compulsory components |  | 49                |                   |
| The total amount of optional components   |  | 26                |                   |
| 3. OTHER TYPES OF TRAINING                |  |                   |                   |
| CC 12                                     | Practical training   | 7                 | credit            |
| CC 13                                     | Preparation and defense of master's thesis   | 8                 | Work protection   |
| TOTAL VOLUME OF EPP                       |  | 90                |                   |

### Annotations of subjects in the curriculum

#### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Business management.** Basic economic concepts. Operating costs of fixed assets. Classification of costs and production in agricultural enterprises. Fundamentals of production theory. Multi-period calculations of investment efficiency. Agricultural management. Planning of economic activity of the enterprise by means of program planning II. Active teaching methods and their role in the preparation of future masters. Human and social capital. Types of investments in human capital and their efficiency. Leadership and leaders in the organization: theory and practice. Time management. Modern experience in training managers for business using international experience. Career planning and management.

**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.

**Business management and controlling.** Analysis and control of the enterprise in the conditions of Ukraine's integration into the world economic space. Accounting in the enterprise management system. Inventory and balance are the basis of analysis and control. Accounting accounts. Special business transactions. The structure of the annual balance sheet. Accounting for enterprise costs. Controlling as a component of making strategic management decisions.

**Methodology of social empirical 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.

**Business planning (Planning and organization of the enterprise).** Enterprise planning: general economic principles. Analysis of production and economic activity. Acquaintance with the work of the production planning program MAX. Acquaintance with the work of the production planning program BER.

**Strategies of international agricultural marketing.** Management of marketing activities of the enterprise. Marketing environment and information system. Agricultural market segmentation. Marketing pricing and product policy. Marketing communications policy.

**Business modeling.** The modern methodology of business design is considered, the basic stages, approaches and basic tools, methodology of business design are defined, efficiency of the logical-structural approach used by the organizations at development of projects of development and restructuring is defined. The main purpose of the course is to give students an idea of the methodology of preparation and implementation, methods and means of attracting resources for the implementation of projects and mechanisms for their management. Project management system. Project implementation control. Project quality and cost management. Information communication in the project. Formation and development of the project team.

**Strategic management and decision making methods.** 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. Models of solving problems of break-even activity. Transport tasks and logistics. Model of formation of optimal investment portfolio. Quantitative methods of project management.

### **Optional components of EPP**

#### *Optional subjects by Student's Choice*

**Agrarian policy.** This discipline acquaints future specialists with the basics of policy formation in the agricultural sector. Both domestic and foreign experience is studied. As a result of mastering the material, 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 economy.

**Technology system.** Technology system. 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

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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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Technique of administrative activity.** Features of the mission and objectives of the organization and the role of management. Corporate culture and definition of rules and regulations. Communications in administrative activities. Business aspects of the organization of interaction in the organization. Communications in administrative activities and search for business partners. Negotiation process technology. National features of business communication. Management decisions and ways to resolve conflicts.

**Content works of management.** The content of work in the enterprise. Organization of work with documents. Technological documentation for content management. Defining and documenting interactions between works. Estimation of duration of works of the personnel of the organization. Formation of personnel policy of the organization in ensuring the capacity of the team. Protection and safety of personnel in the process of work.

**Seminar on preparation of master's work (introduction to scientific work).** 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.

### Optional components of EPP

#### *Optional Block by specialty*

#### *Optional Block 1.*

**Management consulting.** Development of the institute of counseling. Methods of consulting activities. Marketing consulting services. Management consulting technologies.

**Team building and personnel management. Module 1. Team building and conflict resolution.** The purpose of teaching the discipline is to study the features of group dynamics; differences between team and team, determining the main characteristics of the team, the main types of groups depending on the level of development of group activity; basic principles of team work; characteristics of the stages of team formation and development; building team interaction, distribution of roles in the team, application of team building techniques; determining the means of forming a cohesive team; mastering the methods of team building trainings; identify problems of team development.

**Module 2. HR.** Personnel management in the management system of organizations. Personnel management as a social system. Personnel policy and strategy of personnel management of the organization. Personnel planning in organizations. Organization of recruitment and selection of personnel. Organization of activities and functions of personnel management services. Formation of the organization's team.

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Cohesion and social development of the team. Evaluation of personnel in the organization. Management of development and movement of personnel of the organization. Management of the process of staff release. Social partnership in the organization. Effective personnel management

**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 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.

**Critical thinking and management decisions.** The main tasks in teaching the discipline are the definition of organizational and personal goals, decomposition of goals, whole construction. The course provides an outline of the basics of theory and practice of management decision-making: organizational, economic, mathematical, psychological and heuristic aspects of the management decision-making process; targeting management decisions, reducing uncertainty and risk in decision-making at all management levels.

**Cross-cultural management.** Management of relations arising on the border of national and organizational cultures, the causes of intercultural conflicts and their neutralization, clarification and use in the management of the organization of patterns of behavior inherent in the national business culture.

#### *Optional Block 2.*

**Agrotechnical consulting.** Development of strategies for the development of organizations and their individual units. Management of divisions of enterprises and organizations of various forms of ownership, state and municipal authorities. Analytical activity. Assessing the effectiveness of projects taking into account the factor.

**The concept of regional development.** Determining and assessing the level of economic development of the region. Regional development forecasting and planning. Organization of regional management. Development and improvement of organizational management structures, determination of their main properties and types. Control and regulation of regional development.

**Cross-cultural management.** Management of relations arising on the border of national and organizational cultures, the causes of intercultural conflicts and their neutralization, clarification and use in the management of the organization of patterns of behavior inherent in the national business culture.

**Business Foreign Language.** Comprehensive language training. Types of language activity: reading, listening, speaking. Formation of skills of dialogic 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 adequate presentation of the content of scientific information. Formation of knowledge, skills and abilities that will provide the necessary communication skills for masters in the field of professional communication: in particular, the ability to organize and conduct a scientific conference, participate in the conference and make a scientific report, hold a business meeting or negotiate with foreign colleagues and partners.

**Legal bases of administrative activity.** The main provisions of the Concept of Administrative Reform in Ukraine. The current state of the mechanism of administrative and legal regulation of public relations. Rules of Internal Labor Regulations, their legal regulation. Mechanisms for concluding a Collective Agreement. Types and procedures of legal liability. State registration and state regulation of organizations, enterprises, institutions.

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**Training of masters of Sciences  
in branch of knowledge "Management and Administration"  
in specialty "MANAGEMENT"  
educational program "ADMINISTRATIVE MANAGEMENT"  
specialization "Agrokebete"**

|  |   |
|--|---|
| Form of training                                 | Licensed number of students:                            |
| – full-time                                      | 85  |
| – part-time                                      | 50  |
| Duration of training                             |   |
| – full-time educational and professional program | 1,5 year  |
| – part-time                                      | 1,5 year  |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of teaching                             | Ukrainian, English                                      |
| Qualification of graduates                       | manager (administrator) in<br>administrative management |

**The concept of training**

The educational program is focused on training highly professional managers capable of managing agrarian business on the basis of deep professional knowledge and skills in management, agronomy, agricultural engineering, animal husbandry. Graduates have innovative knowledge

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 activities and the introduction of innovative management methods in the face of intensified competition. Training involves the provision of integrated systems knowledge that combines full-fledged basic economic education with practical skills in management decision-making, teamwork, negotiation and presentations for professional activities in the field of business management.

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 program provides a prerequisite for industrial and undergraduate internships in agricultural companies.

**Educational and professional training program**

Training of specialists to manage the process of efficient production in agricultural companies through the introduction of intensive production technologies, cost reduction, increasing economic efficiency of production and intensification of international cooperation on technology exchange and organization of teamwork. Training of 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.

**Areas of employment of graduates**

Management of enterprises and structural subdivisions of enterprises of agrarian and related spheres of economy, including with foreign investments.

### 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.

### Approximate topics of master's theses

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. Strategic decisions of the national producer of compound feeds in poultry farming
6. Substantiation of management decisions in the management of soil fertility zones
7. Introduction of resource-saving technologies in the enterprise
8. Innovative solutions for the disposal of pesticide packaging in Ukraine
9. Marketing strategy in bringing an innovative product to market
10. Substantiation of expediency of introduction of innovative technologies in plant growing.

### Curriculum of Master training in educational program "Administrative Management" (educational and professional training program) specialization "Agrokebete"

| Code n/a  | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|---|--|-------------------|-------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 1.   | Personal effectiveness and efficiency, life and time management  | 4                 | exam              |
| CC.2.   | Team building and personnel management   | 4                 | exam              |
| CC 3.   | Design and management of business processes  | 4                 | exam              |
| CC 4.   | Business management  |                   |                   |
|   | Business management  | 4                 | exam              |
|   | Monitoring and evaluation of performance   | 4                 | exam              |
| CC 5  | Critical thinking and management decisions   | 4                 | exam              |
| CC 6  | Modern approaches and management tools   | 4                 | exam              |
| CC 7  | Business modeling  | 4                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1.   | Business protocol and negotiations   | 3                 | exam              |
| OB 2.   | Seminar on preparation and writing of master's thesis  | 3                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 8  | Technology system  |                   |                   |
|   | Agromony (technology systems)  | 5                 | exam              |

| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|--|--|-------------------|-------------------|
|  | Agricultural engineering (technology systems)  | 5                 | exam              |
|  | Livestock (technology systems)   | 3                 | exam              |
| CC 9   | Smart technologies in agromanagement / Digital technologies in crop production                                       | 3                 | exam              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional Block by specialty</i>               |  |                   |                   |
| OB 2.1.  | Financial management   | 3                 | exam              |
| OB 2.2.  | Managerial Accounting  | 3                 | exam              |
| OB 2.3.  | Organizational behavior and leadership   | 4                 | exam              |
| OB 2.4.  | Business strategies and marketing decisions  | 4                 | exam              |
| OB 2.5.  | Land and legal relations in agribusiness   | 3                 | exam              |
| OB 2.6   | Ethics of business communication   | 3                 | exam              |
| OB 2.7   | Rhetoric   | 2                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>48</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>26</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 10.   | Practical training   | 10                |                   |
| CC 11  | Preparation and defense of master's thesis   | 6                 | Work protection   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

### Annotations of subjects in the curriculum

#### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Personal effectiveness and efficiency, life and time management.** The task of the discipline is to ensure the development of effective systematic thinking of the leader in order to increase their own effectiveness and efficiency, learn to manage their own lives and time, as well as the time of subordinates, which will increase the efficiency of their own work and the team. Acquisition of theoretical knowledge and practical skills of effective personal development of the manager; formation and behavioral skills required for the future leader; development of skills to organize personal work and work of subordinates. The main objectives of the study of this discipline are theoretical and practical training for the acquisition of competencies for managing personal self-development; development of skills of using time as a resource.

**Team building and personnel management.** *Module 1. Team building and conflict resolution.* The purpose of teaching the discipline is to study the features of group dynamics; differences between team and team, determining the main characteristics of the team, the main types of groups depending on the level of development of group activity; basic principles of team work; characteristics of the stages of team formation and development; building team interaction, distribution of roles in the team, application of team building techniques; determining the means of forming a cohesive team; mastering the methods of team building trainings; identify problems of team development.

*Module 2. Personnel management.* Personnel management in the management system of organizations. Personnel management as a social system. Personnel policy and strategy of personnel management of the organization. Personnel planning in organizations. Organization of recruitment and selection of personnel. Organization of activities and functions of personnel management services. Formation of the organization's team. Cohesion and social development of the team. Evaluation of personnel in the organization. Management of development and movement of personnel of the

organization. Management of the process of staff release. Social partnership in the organization. Effective personnel management

**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 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.

**Communicative efficiency.** Discipline allows you to study different ways of measuring the effectiveness of business communications, criteria for their evaluation and factors to increase efficiency, characteristics of communicative personality, principles and objectives of constructive communication; identify existing approaches to determining the effectiveness of communications; criteria for evaluating the effectiveness of business and interpersonal communications; problems that arise when measuring the effectiveness of communications; principles of constructive communication; characteristics of communicative personality; nonverbal and verbal communications, features of the communication process and feedback, methods of improving the efficiency of business communications.

**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 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.

**Business management.** Module 1. Business management. The main purpose of studying this discipline is to form students' analytical creative thinking by mastering the theoretical foundations of business analysis and acquiring skills necessary for practical work, exercising control in all areas of the enterprise as a tool to improve management. In the process of studying the discipline students must learn to understand the essence of economic phenomena and processes, their relationships and interdependence, the ability to detail, systematize and model, determine the impact of factors, evaluate results, identify reserves to improve the efficiency of the enterprise. Conflict identification, conflict management.

*Module 2. Monitoring and evaluation of performance (Key management indicators).* Study of a set of ratios - key management indicators that allow a comprehensive analysis of the company and offer sound management decisions to improve through the criteria of profitability, value, cash flow, probable risk. Determining the rating scale and determining the company's rating.

**Critical thinking and management decisions.** The main tasks in teaching the discipline are the definition of organizational and personal goals, decomposition of goals, whole construction. The course provides an outline of the basics of theory and practice of management decision-making: organizational, economic, mathematical, psychological and heuristic aspects of the management decision-making process; targeting management decisions, reducing uncertainty and risk in decision-making at all management levels.

**Modern approaches and management tools.** 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

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strategic goals of the enterprise. The system of enterprise strategies. Methods and tools of portfolio analysis. Decision theory. Models of solving problems of break-even activity. Transport tasks and logistics. Model of formation of optimal investment portfolio. Quantitative methods in strategic management.

**Business modeling.** General characteristics of project management. Project management system. Functions, principles, methods of business modeling. Design functions, design principles, organizational principles of project construction and definition of changes. Project environment and modern models of design solutions. Project implementation control. Project quality and cost management. Information communication in the project. Formation and development of the project team.

### **Optional components of EPP**

*Optional subjects by Student's Choice*

**Business protocol and negotiations.** Business protocol and negotiations. The discipline studies modern requirements for management, in particular in such areas, business protocol and ethics as its important component, corporate responsibility - the first step to ethical behavior, preparation for negotiations, introduction of negotiations (main stages and their characteristics), methods of negotiation, styles negotiation, analysis of the results of negotiations and implementation of the agreements reached, rules and regulations of business meetings, the main points of the agreement on a business meeting, preparation of premises and meeting of delegates ii.

**Seminar on writing a master's thesis.** The main stages of development of Ukrainian science and higher education, their current state, features of gradual reform of higher education with a focus on the preparation of masters, candidates and doctors of sciences. Methods of scientific research (historical, biological, zootechnical, veterinary, special), and the formation of the purpose, subject and object of scientific research, tasks of scientific research, invention and patent science.

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

### **Compulsory components of EPP**

**Technology system. 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,

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technology of sheep production. Acquisition of knowledge on breeding and feeding of farm animals, their maintenance, animal hygiene.

**Smart technologies in agromanagement/Digital technologies in crop production.** The purpose of the discipline is to consider the main problems and prospects of using the latest advanced technologies in agriculture of Ukraine. Study of individual UAV technologies in agriculture, precision farming systems, satellite monitoring, meteorology, soil scanners, etc., the logic of their application, value, etc. To ensure the study of each operation in agricultural production (tillage, fertilizer application, sowing, PPE application, harvesting) by the logic of correct and most effective application of the necessary AgTech technologies.

### **Optional components of EPP**

#### *Optional Block by specialty*

**Financial management.** Discipline in a logical sequence reveals the essence of enterprise finance, their functions, principles of organization; the role of finance in the activities of enterprises and features of the finance of enterprises of various organizational and legal forms; the essence of costs and profits of enterprises, the mechanism of their formation and management; features of the organization of current assets at the enterprise; economic content and lending mechanism of enterprises; the content of financial support for the reproduction of fixed assets. Students must acquire practical skills of financial analysis, forecasting, use of financial instruments in the management of production and sales, etc.

**Managerial Accounting.** The purpose of the discipline is to form a system of scientific knowledge on the organization and methods of management accounting for their use in the preparation of information necessary for management decisions and their evaluation. The objectives of the discipline are to reveal the principles and methods of management accounting, its place and role in managing the enterprise, the formation of skills to apply appropriate methods and techniques in the accounting process to prepare information needed by managers to make informed decisions. The subject of the discipline are costs, production costs, its calculation, income, financial results by segments of activity.

**Organizational behavior and leadership.** The purpose of the discipline is to form students' knowledge of behavioral economics, which involves learning to act rationally, with maximum benefit for themselves. determining the role of emotions in purchasing goods, errors in purchasing goods, risk appetite and effective savings, prudent investments, efficient market hypothesis, framing, bias and self-control in the implementation of consumer behavior. Studying the discipline allows you to understand the laws of nature and be guided by gifted eternal values, develop a culture of mutual trust and respect, ensure a harmonious team, understand differences in the behavior of subordinates, the concept of creative space for others, effective delegation of authority, leadership development programs.

**Business strategies and marketing decisions.** The task of the discipline is to provide students with a holistic and consistent system of theoretical knowledge and practical skills in the main areas of marketing: research, comprehensive analysis and forecasting of the market, development of marketing strategy and tools for its implementation (product and pricing policy, distribution policy, communication policy, marketing control) ). 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. Definition of assortment, price, sales policies, basic strategies of integrated marketing communication.

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**Land and legal relations in agribusiness.** The main provisions of land reform in Ukraine. The current state of the mechanism of administrative and legal regulation of relations in the agricultural sector. Types and procedures of legal liability. State registration and state regulation of organizations, enterprises, institutions.

**Ethics of business communication.** Study of ethical norms and ritual rules of business relations, acquisition of knowledge and skills related to the exchange of information, use of methods and means of interaction, mutual understanding. Moral norms of business communication. Study of rules and norms of behavior of partners which promote development of cooperation. Code of honor for employees. Tools and methods of professional communication, professional culture of communication, norms of communication, document flow in the organization, types of documents.

**Rhetoric.** The purpose of studying the discipline is to obtain knowledge of the basics of classical and modern rhetoric as a science of mental and linguistic activity; acquisition of knowledge of persuasion, influence, achievement of goals in the process of language communication, as well as acquisition of skills and abilities to analyze and produce texts of different types in accordance with the purpose, purpose and conditions of communication in the process of professional activity.

**Training of masters of Sciences  
in branch of knowledge "Management and Administration"  
in specialty "MANAGEMENT"  
educational program "ADMINISTRATIVE MANAGEMENT"  
specialization "Management of health care facilities"**

|  |   |
|--|---|
| Form of training                       | Licensed number of students:                            |
| – part-time                            | 50  |
| Duration of training                   |   |
| – part-time                            | 1,5 year  |
| Credits ECTS:                          |   |
| – educational and professional program | 90  |
| Language of teaching                   | Ukrainian   |
| Qualification of graduates             | manager (administrator) in<br>administrative management |

**The concept of training**

The educational program is focused on training highly professional managers in the field of health care, able to manage health care facilities on the basis of mastering deep professional knowledge and skills, modern computer technology, innovative knowledge.

The Administrative Management educational program is the highest level of business qualification of a manager and one of the most prestigious business education programs 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 methods of management in a competitive environment; providing students with integrated systems knowledge that combine full-fledged basic economic education with practical skills in management decision-making, teamwork, negotiation and presentations for professional activities in the field of health care management.

**Educational and professional training program**

Training of specialists for the management of health care facilities through the introduction of innovative management technologies, cost reduction, increasing economic efficiency and organizing teamwork. Training of top 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 health care facilities and their structural units.

**Approximate topics of master's theses**

1. Psychology of management in the field of health care
  2. World experience in the organization and management of the health care system and the ability to adapt it to the conditions of Ukraine
  3. Areas of reform and the concept of health care development in Ukraine
  4. Priority areas of management of training of heads of health care institutions.
  5. Personnel policy of the health care institution
  6. Public health as an indicator of national security.
  7. Demographic problems of Ukraine as an integral indicator of public health
  8. Administration of the health care reform process in Ukraine
  9. Health insurance as a component of compulsory social insurance in Ukraine.
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10. Organizational and legal aspects of ensuring the personnel policy of health care institutions.

**Curriculum of Master training  
in educational program "Administrative Management"  
(educational and professional training program)  
specialization "Management of health care facilities"**

| Code n/a   | Components of the educational program (academic disciplines, course projects (works), practices, qualification work) | Number loans | Form final control |
|--|--|--------------|--------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                 |  |              |                    |
| <b>Compulsory components of EPP</b>              |  |              |                    |
| CC 1   | Legal bases of administrative activity   | 3            | exam               |
| CC 2   | Introduction to scientific work  | 3            | exam               |
| CC 3   | Methodology of social empirical research   | 3            | exam               |
| CC 4   | Content management of works  | 3            | exam               |
| CC 5   | Management information technologies  | 4            | exam               |
| CC 6   | Business analysis and controlling  | 3            | exam               |
| CC 7   | Business management  | 3            | exam               |
| CC 8   | HR   | 3            | exam               |
| CC 9   | Management consulting  | 3            | exam               |
| CC 10  | Technique of administrative activity   | 3            | exam               |
| CC 11  | financial management   | 3            | exam               |
| CC 12  | Economic informatics   | 4            | exam               |
| CC 13  | Business analysis in Excel   | 3            | exam               |
| CC 14  | Presentation and WEB-design  | 3            | exam               |
| <b>Optional components of EPP</b>                |  |              |                    |
| <i>Optional subjects by Student's Choice</i>     |  |              |                    |
| OB 1   | Strategic marketing  | 4            | exam               |
| OB 2   | Project management and evaluation  | 4            | exam               |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |  |              |                    |
| <b>Compulsory components of EPP</b>              |  |              |                    |
| CC 15  | Management of medical institutions   | 4            | exam               |
| CC 16  | Management psychology and conflictology  | 3            | exam               |
| CC 17  | Marketing of medical services  | 3            | exam               |
| <b>Optional components of EPP</b>                |  |              |                    |
| <i>Optional Block by specialty</i>               |  |              |                    |
| <i>Optional Block 1</i>                          |  |              |                    |
| OB 1.1   | Medical Insurance  | 3            | exam               |
| OB 1.2   | Anti-crisis management of health care facilities   | 5            | exam               |
| OB 1.3   | Business ethics in healthcare  | 3            | exam               |
| OB 1.4   | Material resources management  | 4            | exam               |
| OB 1.5   | Quality management of medical services   | 5            | exam               |
| <b>The total amount of compulsory components</b> |  |              | <b>54</b>          |
| <b>The total amount of optional components</b>   |  |              | <b>28</b>          |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |              |                    |
| CC 18  | Preparation and defense of master's thesis   | 8            | Work protection    |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  |              | <b>90</b>          |

**Annotations of curriculum disciplines**

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

**Legal basis of administrative activity.** The main provisions of the Concept of Administrative Reform in Ukraine. The current state of the mechanism of administrative

and legal regulation of public relations. Rules of Internal Labor Regulations, their legal regulation. Mechanisms for concluding a Collective Agreement. Types and procedures of legal liability. State registration and state regulation of organizations, enterprises, institutions.

**Introduction to scientific work.** The main stages of development of Ukrainian science and higher education, their current state, features of gradual reform of higher education with a focus on the preparation of masters, candidates and doctors of sciences. Methods of scientific research (historical, biological, zootechnical, veterinary, special), and the formation of tasks of scientific research, invention and patent science.

**Methodology of social empirical research.** Theoretical foundations and hardware of modern information systems. Data management. Economic information processing software. Organization of effective search on the Internet. Application software for economic data processing. 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.

**Content management.** Content management of works. The content of work in the enterprise. Organization of work with documents. Technological documentation for content management. Defining and documenting interactions between works. Estimation of duration of works of the personnel of the organization. Formation of personnel policy of the organization in ensuring the capacity of the team. Protection and safety of personnel in the process of work.

**Management information technologies.** Analysis of information technology, which is presented as a set of processes that operate on primary information to obtain an information product. The considered expert technologies allow to receive knowledge and to make the optimum decision in a certain situation with greater efficiency. The branch of mathematical modeling of business processes and methods of decision-making with optimization according to the set criterion is investigated. Information on basic network technologies, protocols and services, search engines, electronic payment systems, types of information and software products and possible threats to them. Protection of personal information and counteraction to malicious software products.

**Business analysis and controlling.** Formation of students' analytical creative thinking by mastering the theoretical foundations of business analysis and acquisition of skills necessary for practical work, control in all areas of the enterprise as a tool to improve the efficiency of management. In the process of studying the discipline students must learn to understand the essence of economic phenomena and processes, their relationships and interdependence, the ability to detail, systematize and model, determine the impact of factors, evaluate results, identify reserves to improve the efficiency of the enterprise.

**Business management.** Basic economic concepts. Operating costs of fixed assets. Classification of costs and production in agricultural enterprises. Fundamentals of production theory. Multi-period calculations of investment efficiency. Agricultural management. Planning of economic activity of the enterprise by means of program planning II. Business management: business game. Active teaching methods and their role in the preparation of future masters. Human and social capital. Types of investments in human capital and their efficiency. Leadership and leaders in the organization: theory and practice. Time management. Modern experience in training managers for business using international experience. Career planning and management.

**Personnel management.** Personnel management in the management system of organizations. Personnel management as a social system. Personnel policy and strategy of personnel management of the organization. Personnel planning in organizations. Organization of recruitment and selection of personnel. Organization of activities and

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functions of personnel management services. Formation of the organization's team. Cohesion and social development of the team. Evaluation of personnel in the organization. Management of development and movement of personnel of the organization. Management of the process of staff release. Social partnership in the organization. Effective personnel management.

**Management consulting.** Development of the institute of counseling. Methods of consulting activities. Marketing consulting services. Management consulting technologies.

**Technique of administrative activity.** Features of the mission and objectives of the organization and the role of management. Corporate culture and definition of rules and regulations. Communications in administrative activities. Business aspects of the organization of interaction in the organization. Communications in administrative activities and search for business partners. Negotiation process technology. National features of business communication. Management decisions and ways to resolve conflicts.

**Financial management.** Theory and practice of financial management of enterprises, which allows to form modern economic thinking and a system of special knowledge about financial and economic relations that arise in the process of formation, distribution and use of financial resources of economic entities. Acquisition of practical skills of application of financial management tools in financial activity management.

**Economic Informatics.** The current state of the world market of software products, the use of the operating system MS Windows Vista, the office suite MS Office XP for solving professional problems in economics are considered. Acquisition of skills in the use of applied systems of economic data processing and programming systems for personal computers and local computer networks in the study of socio-economic systems and solving problems of professional orientation.

**Business planning.** Enterprise planning: general economic principles. Analysis of production and economic activity. Acquaintance with the work of the production planning program MAX. Acquaintance with the work of the production planning program BER.

**Presentation and WEB-design.** Brief description of the HTML language. HTML document. Determining the general parameters of documents. Text formatting. Using title tags. Formatting an HTML document. Use comments and special characters. Drawings. Sound. Hyperlinks. Lists. Bulleted lists. Numbered lists. Tables. Presentations.

### **Optional components of EPP**

#### *Optional subjects by Student's Choice*

**Strategic marketing.** Management of marketing activities of the enterprise. Marketing environment and information system. Agricultural market segmentation. Marketing pricing and product policy. Marketing communications policy.

**Project management and evaluation.** General characteristics of project management. Project management system. Project implementation control. Project quality and cost management. Information communication in the project. Formation and development of the project team.

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

### **Compulsory components of EPP**

**Management of medical institutions.** Approaches to the management and organization of medical services to the population, features of the functioning of medical institutions. Study of basic and specific management functions. Principles, methods and tasks of management. The process of making managerial decisions.

**Management psychology and conflictology.** The essence and content of the main categories of psychological science used in management, the psychological characteristics of the modern manager (temperament, stable and individual characteristics

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of mental processes, orientation, etc.) and their impact on the effectiveness of management. The problems of development and dynamics of the labor collective, criteria of its stability, compatibility of group members and types of groups are deeply analyzed. Theory of intervention in conflict situations (General concept of conflict situation and conflict. Model of conflict process. Types and types of conflicts. Objective and subjective preconditions and causes of conflict situations and conflicts. The main elements of the theory of intervention).

Norm as a basis for assessing conflict behavior (Normative requirements for social forms of behavior. Altruism and selfishness as social norms of behavior. Coercive norms of behavior in interpersonal relationships). Power relations in organizations. The nature of the conflict in the enterprise (The concept of labor collective and its functions. Classification of labor collectives and their structure. Formal and informal groups. Characteristics of informal organizations and their management. Model of conflict process. Consequences of conflict).

**Marketing of medical services.** Understanding the importance of marketing medical services, its features; study of the market of medical services, its structuring at the state level, regulation and regulatory support; to ensure the assimilation of the features of marketing tools in the activities of organizations in the field of medical services. Strategies in the market of medical services; features of product policy, pricing policy, features of marketing communication policy, features of control and audit of marketing of medical services.

### **Optional components of EPP**

#### *Optional Block by specialty*

**Medical Insurance.** Medical 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.

**Business ethics in healthcare.** Study of a set of practical forms of human relationships in the professional sphere; their value content and significance; processes of sensory cognition of reality; commercial etiquette in organizational behavior, economics, finance, accounting, marketing. Study of principles, principles, norms of ethics at the level of business environment; the nature and essence of ethics; historical development of business ethics; main directions and concepts of ethics; formation of moral behavior; corporate culture; administrative ethics; ethical norms of communication; culture of public speaking; etiquette of telephone conversations, business meetings, meetings; etiquette of business international relations; style and manners of a businessman.

**Material resources management.** The concept and composition of material resources of the enterprise. The essence of system management of material resources. Methodological - analytical and organizational support of material resources management processes. Analysis of the system of planning and provision of the enterprise with material resources. Reserves and ways of rational use of material resources.

**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. Execution of control functions in health care institutions.



**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 | 1,5 years                    |
| – Full-time educational and research program     | 2 years                      |
| – Part-time                                      | 1,5 years                    |
| Credits ECTS:                                    |                              |
| – educational and professional program           | 90                           |
| – educational and research program               | 120                          |
| Language of Teaching                             | Ukrainian, English           |
| Qualification                                    | Master in project management |

**The concept of training**

The training in the educational program is aimed at training specialists in the development of investment policy of companies and project management, the search for international programs and grants and defining of sources of investment due to the need for agribusiness in project managers, project coordinators and managers, investment managers and analysts, managers of investment departments and investment consultants. There are opportunities for students of mastering the writing of projects and obtaining a diploma in leading Polish institutions and a diploma of NUBiP of Ukraine through the programs of double diplomas.

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

***Optional Block “Management of Investment Activity”***

The aim of the program is to train investment management specialists who are able to develop and substantiate the concept of an investment project in a qualified way, evaluate its effectiveness taking into account risk factors and uncertainty, perform a feasibility study and develop a business plan of the project, evaluate and select the most effective investment instruments, to develop the budget and budget of the project and to ensure its implementation, to form the project team, to monitor the implementation of the project and to carry out management of changes.

**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 different industries and fields of activity, investment companies and investment units of large enterprises.

**Practical training**

Future specialists in project and program management in the field of material (intangible) production, for example, develop real investment projects studying the features of management investment activities, acquire practical skills in compiling a business plan investment project, an analysis of the financial state of economic entities and the definition

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of investment, estimation of quantitative and qualitative characteristics of investment projects, optimization of investment portfolio management, investment estimation the attractiveness and selection of specific projects.

#### **Offered Topics for Master Thesis**

1. Strategic analysis of the factors influencing the investment of the agricultural sector.
2. The role of the state in stimulating the investment activity of processing enterprises.
3. Estimation of investment attractiveness of the region (enterprise).
4. Organization of pre-investment research in the market of organic products.
5. Modeling of the investment strategy of the 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 efficiency of the investment activity of the corporation.
9. Formation of business strategy of the enterprise.
10. Management of realization of investment project at the enterprise.

#### ***Optional Block “Management of International Projects”***

The aim of the program is to prepare specialists in managing international projects that will have the knowledge and practical skills to find information on international programs and grants, to prepare and submit project applications and to manage projects with the use of international project standards. The program involves the training of skilled personnel capable of creative professional activities 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 fields of activity, in international companies.

#### **Practical training**

Future masters, for example, prepare real international projects to study the basic requirements for their writing and implementation, mastering the directions of grant activities of international organizations and governments of countries. As potential managers, they learn to manage international projects, gain 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 challenging investment environment.

#### **Offered Topics for Master 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 the investment project.
  5. Management of risks and changes in a project.
  6. Management of realization of investment project of agricultural enterprise.
  7. Development of a strategy for financing innovative projects.
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8. Financial justification of the programs at the stage of pre-design studies.
9. Management of the efficiency of investment projects of agricultural enterprises.
10. Risk management in investment projects of agricultural enterprises.

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

#### ***Optional Block “Management of international projects”***

The aim of the program is to train scientists in the field of investment research and management of international investment projects in agribusiness, which are able to research, analyze, develop and justify concepts of investment development at the macro and micro levels, develop investment projects, select the most effective investment instruments and provide investment strategy.

#### **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 different industries and fields of activity, investment companies and investment units of large enterprises.

#### **Practical training**

Future masters, on the example of preparing real international projects, study the basic requirements for their writing and implementation, master the areas of grant activity of international organizations and governments of countries. As potential managers, they learn how to manage international projects, gaining knowledge of the practical aspects of finding funding through analysis of international programs and grants, and negotiating with potential partners in a complex investment environment.

#### **Offered Topics for Master Thesis**

1. International programs and grants as sources of funding for projects.
2. Developing a business plan for an international project for an agricultural enterprise.
3. Development of an investment project for an agricultural enterprise.
4. Cost management of the investment project.
5. Risk and change management in the project.
6. Management of the implementation of an investment project of an agricultural enterprise.
7. Development of a strategy for financing innovative projects.
8. Financial justification for pre-project research programs.
9. Management of efficiency of investment projects of agricultural enterprises.
10. Risk management in agricultural investment projects

**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 |
|---|--|-------------------|-------------------|
| 1. GENERAL TRAINING CYCLE                               |  |                   |                   |
| Compulsory components of EPP                            |  |                   |                   |
| CC 1.   | Investment management  | 5                 | exam              |
| CC 2.   | Macroeconomic analysis and investment strategy   | 4                 | exam              |
| CC 3.   | Project Management<br>Module 1. Management of project risks<br>Module 2. Creative technologies in management of Start-Up projects  | 8                 | exam              |
|   | exam   |                   |                   |
| CC 4  | Methodology and Organization of scientific Research with the Principles of Intellectual Property   | 3                 | exam              |
| CC 5  | Crisis Management  | 4                 | exam              |
| Optional components of EPP                              |  |                   |                   |
| Optional subjects by Student's Choice                   |  |                   |                   |
| OB 1  | Optional discipline 1.(Emotional Intelligence)   | 4                 | exam              |
| OB 2  | Optional discipline 2. (Business foreign language)   | 4                 | exam              |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE                |  |                   |                   |
| Compulsory components of EPP                            |  |                   |                   |
| CC 6  | International programs and grants  | 4                 | exam              |
| CC 7  | Project approach in business management  | 4                 | exam              |
| CC 8  | Project Financing  | 4                 | exam              |
| CC 9  | Marketing strategy in project management   | 4                 | exam              |
| CC 10   | Information technologies in project management<br>Module 1. Scrum, agile, MS Project in project management<br>Module 2. Creative technologies in management of social projects | 8                 | exam              |
|   | exam   |                   |                   |
| Optional components of EPP                              |  |                   |                   |
| Optional Block according to the choice of specialty     |  |                   |                   |
| Optional Block 1. "Management of Investment Activities" |  |                   |                   |
| OB 1.1.   | Strategic Project Management:<br>Business Game "Management of Project Capital"<br>Business game "Strategy for investing in Agriculture"  | 10                | exam              |
| OB 1.2.   | Business game "Investment Policy of the Agrarian Enterprises"  | 6                 | exam              |
| Optional Block 2 "Management of international projects" |  |                   |                   |
| OB 2.1.   | Strategic Project Management:<br>Business Game "Management of Project Capital"<br>Business game "Strategy for development a project in Agriculture"                            | 10                | exam              |
| OB 2.2  | Forming, management and development of a project team  | 6                 | exam              |
| The total amount of compulsory components:              |  | 48                |                   |
| The total amount of optional components                 |  | 24                |                   |
| 3. OTHER TYPES OF TRAINING                              |  |                   |                   |
| CC 11   | Practical Training   | 8                 | credit            |
| CC 12   | Preparation and defense of master's thesis   | 10                | Thesis defence    |
| THE TOTAL AMOUNT OF EPP                                 |  | 90                |                   |

## Annotations of disciplines in the curriculum

### 1. GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Investment management.** Tasks, functions and organizational providing of investment management. Methods of investment analysis. Investment planning. The principles forming, methods development and evaluation of investment strategy. Features of real investment. Types of investment projects. Risk evaluation of real investment projects. Forming program of real investment. Management of investment projects. The structure of the real investment project. Optimization of risks and evaluation of real investment project. Features of the financial investment. Policy management of financial investments. Evaluation of effectiveness and risks of financial instruments. Management of financial investments portfolio.

**Macroeconomic analysis and investment strategy.** Essence of macroeconomic analysis and its place in the sciences. System of National Accounts as a tool of macroeconomic analysis. Analysis of economy sectors. Analysis of macroeconomic imbalances. Analysis of macroeconomic policy. Analysis of macroeconomic factors. Analysis of the effectiveness of strategic investment tools. Investment strategy of the enterprise and the principles of its development. The methods of investment strategy development. Forming of strategic aims of investment activity. Justification of strategic directions and forms of investment. Evaluating of investment strategy effectiveness.

**Project management.** The essence of project management. Features of project management in Agriculture. Basic project management processes and their relationships. Project participants. Project development stages. Project cost planning, methods and means of its estimation. Features of control over the implementation of agricultural projects. Identification, assessment and risk minimization methods at different phases of the project. Development of risk minimization measures. Implementation of projects in agroindustrial complex with the support of donor organizations, features of management. Project risk management. The essence of project management. Technical and socio-cultural aspects of project management. Basic project management processes and their relationships. Project participants. Project development stages. Project cost planning, methods and means of its estimation. Types, causes and consequences of project risks. Identification, assessment and risk minimization methods at different phases of the project. Development of risk minimization measures.

**Methodology and Organization of Scientific Research with the Principles of Intellectual Property.** Science and research in the modern world. Specificity of research activities, types and features of scientific research. Characteristics of the general methodology of scientific development. Well-grounding of stages and design of results of research works. Information retrieval technologies in the process of scientific work. Methods of preparation and registration of publications, technique of writing text. Intellectual property: concepts, features. The main institutes of intellectual property law. Sources of Intellectual Property Law. objects and subjects of intellectual property rights. Personal non-property and property rights of intellectual property. Use of intellectual property. Protection of intellectual property rights.

**Crisis management.** General concepts of crisis and crisis phenomena. Crisis classification. Cyclical nature of crisis phenomena. Crisis recognition methodology. The purpose and objectives of crisis management. Firm resilience and crisis. Transition periods of enterprise development. The crisis as a turning point in development. The system of control and early detection of signs of a future crisis. Problems of crisis management and differentiation of management technologies. Functional and crisis management. Crisis

management scheme. The role of innovation in crisis management. Situational approach to crisis management. Organization of work to overcome the crisis.

### **Optional components of EPP**

*Optional choice from the list of the disciplines according to the students' preferences*

**Emotional intelligence.** In today's economic situation, it is a very important skill to solve problems related to emotions. We often have to work together to find a solution. Therefore, business success is not driven by your diploma, IQ test results, or any other performance-based metrics. EI characterizes a person's ability to recognize emotions both of other people and of himself. I believe that before you can lead and direct others, you need to understand your emotions. Therefore, EI is associated with self-knowledge. The result of high EI is self-knowledge. The ability to understand itself leads to greater happiness. A high level of happiness is an indicator of job satisfaction. Enjoying your work gives you the best results. Good results lead to recognition. Recognizing our successes makes us feel meaningful. This feeling leads us to greater happiness, better results.

**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.

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

### **Compulsory components of EPP**

**International programs and grants.** Research grants. State fund for fundamental research, Grants of NATO, U.S. Civilian Research & Development Foundation, Funds of European governments. Grants of International Agency for the development of culture, education and science (IADCES). Structural funds of EU. scholarships for study and research. International European innovative OBientific and technical program Eureka. International Visegrad Fund. Eurasia Foundation.

**Project approach in business management.** Business Management Systems and their combination. The project ideology and benefits of project approach to the business organization. The principles of project activities. Identification of the problems, which affect to success of projects. Model project-oriented behavior of business. The development of applied principles of project approach in business management.

**Project financing.** Theoretical principles of project financing. System of project financing organization. Project management in the project financing system. Evaluation of the effectiveness of investment projects in the project financing system. Sources of project financing. Cost and structure of investment resources in project financing. Features of organization of different 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 overall enterprise management system. Functions of management of marketing activity. Trends and concepts of marketing activity management. Marketing activity of the enterprise as a process. Organization and stages of marketing activities management.

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Tasks and stages of organization of marketing activity. Organizational structure of marketing activity management. Cross-functional coordination of enterprise units in the process of marketing functions. Marketing strategic planning. Control as a means of improving the effectiveness and efficiency of marketing activities. Management of marketing tools.

**Information technologies in project management:** The role and place of information systems and technologies in project management. Methods and methodology of information systems design in project planning. System-methodological aspects of modeling in project management. Requirements for project team and its manager, requirements for system analyst. Means of structural analysis. CASE technologies. Flow charts. Context diagrams. Professional and non-professional project management systems. Modern Microsoft Project 2010 project management software. Project resources in MS Project. Advanced MS Project features. Primavera Software Package. ConceptDraw software. MS Visio software. Project Expert software. CRM systems.

**Scrum, agile, MS Project in project management.** Agile is a program development approach that exposes the philosophy of the approach through four core values: people and interactions are more important than processes and tools; working program is more important than comprehensive documentation; cooperation with Customers is more important than negotiating contract terms; readiness for change is more important than going through the previous plan. scrum is a project management methodology built on the principles of time management. Its main feature is involvement in the process of all participants, and each participant has its own role. The bottom line is that not only the team is working on solving 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 only mean constant control.

**Creative technologies in the management of social projects.** 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 conditions of globalization. Management of individual factors: social perception, assessment of qualifications, skills, personalities, mentality, introspection, emotions and attitude to the organization. Motivation: needs, job design, career satisfaction. Equality theories, expectations and goal setting. Involvement of staff and increase of productivity. Group Factor Management and Social Processes: Effective Groups and Teams, Decision Making, Conflict and Negotiation Management, Communication in the Digital Age. Organization Performance Management. Contemporary leadership: situational, contextual and behavioral theories, charismatic and transactional leaders. Creation of creative enterprises capable of transformation based on new experience and requirements of competitive business environment.

*Optional Block 1. "Management of Investment Activities"*

**Strategic Project Management: A business game "Management of Project Capital".** Business game as a means of modeling the situation of management decision-making in management of project capital. 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 cost of capital. To form the ability to think critically about models for determining the value of equity and theories of capital structure optimization. Enhance 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 cost of capital of the enterprise. Presentation of the obtained results.

**Business game "Strategy of Investing in Agriculture".** Business game as a means of modeling the situation of management decision-making regarding strategic

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project management. Creation of several teams of players to solve the problem of forming a set of strategic alternatives and justifying the choice of one of them in the management of a specific project. Investment activity is closely linked to other fundamental systems of enterprise management, to financial management through the formation of investment resources; to production management (this relationship is mediated through joint management of fixed and circulating assets); to personnel management through intellectual investment in the employees of the enterprise.

**Business game "Investment policy of agricultural enterprises".** Business game as a means of modeling the situation in making management decisions on the formation of investment policy of agrarian enterprises. Creation of several teams of players to solve a specific task of shaping the investment policy of agribusiness enterprises. Finding and justifying the choice of the best alternative investment activities and building on this basis the investment strategy of enterprises, determining the mechanisms for their implementation. Formation of a portfolio of investment projects. Assessment of investment policy effectiveness of agricultural enterprises. Presentation of the obtained results.

*Optional Block 2 "Management of international projects"*

**Strategic Project Management: Business game "Management of Project Capital".** Business game as a means of modeling the situation of management decision-making 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 cost of capital. To form the ability to think critically about models for determining the value of equity and theories of capital structure optimization. Enhance 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 cost of capital of the enterprise. Presentation of the obtained results.

**Business game "Strategy for development a project in Agriculture"** Business game as a means of modeling the situation of management decision-making regarding strategic project management. Creating multiple teams of players to solve the problem of forming a set of strategic alternatives and justifying the choice of one in managing a particular project. The initial conditions of the business game: the competitive position of the company, the trends of market development, which presents the company, the strengths and weaknesses of the company and its competitors, determining the competitive advantages and opportunities to strengthen them, the effectiveness of embedding the project in the strategy of enterprise development. Identifying the terms and options for the project's resource support and selecting the best one. Presentation of the obtained results.

**Formation, management and development of the project team.** The need and principles of forming a project team. Methods and organizational aspects of team formation. The main characteristics of the project team. Organization of team interaction. Psychological features of project team management. Management of an international project team. Conflict management.

**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 (paper), practice, qualification work)  | Amount of credits | The form of the final control |
|---|---|-------------------|-------------------------------|
| 1. GENERAL TRAINING CYCLE   |   |                   |                               |
| Compulsory components of ERP  |   |                   |                               |
| CC 1  | Investment management   | 5                 | exam                          |
| CC 2  | Macroeconomic analysis and investment strategy  | 4                 | exam                          |
| CC 3  | Project Management<br>Module 1. Management of project risks<br>Module 2. Creative technologies in management of Start-Up projects   | 8                 | exam                          |
|   |   |                   | exam                          |
| CC 4  | Methodology and Organization of scientific Research with the Principles of Intellectual Property  | 3                 | exam                          |
| CC 5  | Crisis Management   | 4                 | exam                          |
| Optional components of ERP  |   |                   |                               |
| optional choice from the list of the disciplines according to the students' preferences |   |                   |                               |
| OB 1  | Optional discipline 1. (Emotional Intelligence)   | 4                 | exam                          |
| OB 2  | Optional discipline 2. (Business foreign language)  | 4                 | exam                          |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE  |   |                   |                               |
| Compulsory components of ERP  |   |                   |                               |
| CC 6  | International programs and grants   | 4                 | exam                          |
| CC 7  | Project approach in business management   | 4                 | exam                          |
| CC 8  | Project Financing   | 4                 | exam                          |
| CC 9  | Marketing strategy in project management  | 4                 | exam                          |
| CC 10   | Information technologies in project management<br>Module 1. Scrum, agile, MS Project in project management<br>Module 2. Creative technologies in management of social projects      | 8                 | exam                          |
|   |   |                   | exam                          |
| Optional components of ERP  |   |                   |                               |
| Optional Block according to the choice of specialty                                     |   |                   |                               |
| Optional Block 1 "Management of international projects"                                 |   |                   |                               |
| OB 1.1  | Strategic Project Management in Agriculture:<br>Business Game «Investment policy of the agrarian enterprise»<br>Business game "Management of international projects in agriculture" | 10                | exam                          |
| OB 1.2  | Forming, management and development of a project team   | 6                 | exam                          |
| The total amount of compulsory components:  |   | 48                |                               |
| The total amount of optional components:  |   | 24                |                               |
| 3. OTHER TYPES OF TRAINING  |   |                   |                               |
| CC 11   | Practical Training  | 20                | credit                        |
| OB 1.3.1  | Research practice   | 8                 | credit                        |
| OB 1.3.2  | Pedagogical (assistant) practice  | 8                 | credit                        |
| CC 12   | Preparation and defense of master's thesis  | 20                | Thesis defence                |
| THE TOTAL AMOUNT OF ERP   |   | 120               |                               |

## Annotations of disciplines in the curriculum

### 1. GENERAL TRAINING CYCLE

#### Compulsory components of ERP

**Investment management.** Tasks, functions and organizational providing of investment management. Methods of investment analysis. Investment planning. The principles forming, methods development and evaluation of investment strategy. Features of real investment. Types of investment projects. Risk evaluation of real investment projects. Forming a program of real investment. Management of investment projects. The structure of the real investment project. Optimization of risks and evaluation of real investment project. Features of the financial investment. Policy management of financial investments. Evaluation of effectiveness and risks of financial instruments. Management of financial investments portfolio.

**Macroeconomic analysis and investment strategy.** Essence of macroeconomic analysis and its place in the sciences. System of National Accounts as a tool of macroeconomic analysis. Analysis of economy sectors. Analysis of macroeconomic imbalances. Analysis of macroeconomic policy. Analysis of macroeconomic factors. Analysis of the effectiveness of strategic investment tools. Investment strategy of the enterprise and the principles of its development. The methods of investment strategy development. Forming of strategic aims of investment activity. Justification of strategic directions and forms of investment. Evaluating of investment strategy effectiveness.

**Project management.** The essence of project management. Features of project management in Agriculture. Basic project management processes and their relationships. Project participants. Project development stages. Project cost planning, methods and means of its estimation. Features of control over the implementation of agricultural projects. Identification, assessment and risk minimization methods at different phases of the project. Development of risk minimization measures. Implementation of projects in agroindustrial complex with the support of donor organizations, features of management. Project risk management. The essence of project management. Technical and socio-cultural aspects of project management. Basic project management processes and their relationships. Project participants. Project development stages. Project cost planning, methods and means of its estimation. Types, causes and consequences of project risks. Identification, assessment and risk minimization methods at different phases of the project. Development of risk minimization measures.

**Methodology and Organization of Scientific Research with the Principles of Intellectual Property.** Science and research in the modern world. Specificity of research activities, types and features of scientific research. Characteristics of the general methodology of scientific development. Well-grounding of stages and design of results of research works. Information retrieval technologies in the process of scientific work. Methods of preparation and registration of publications, technique of writing text. Intellectual property: concepts, features. The main institutes of intellectual property law. Sources of Intellectual Property Law. Objects and subjects of intellectual property rights. Personal non-property and property rights of intellectual property. Use of intellectual property. Protection of intellectual property rights.

**Crisis management.** General concepts of crisis and crisis phenomena. Crisis classification. Cyclical nature of crisis phenomena. Crisis recognition methodology. The purpose and objectives of crisis management. Firm resilience and crisis. Transition periods of enterprise development. The crisis as a turning point in development. The system of control and early detection of signs of a future crisis. Problems of crisis management and differentiation of management technologies. Functional and crisis management. Crisis

management scheme. The role of innovation in crisis management. Situational approach to crisis management. Organization of work to overcome the crisis.

### **Optional components of ERP**

*Optional choice from the list of the disciplines according to the students' preferences*

**Emotional intelligence.** In today's economic situation, it is a very important skill to solve problems related to emotions. We often have to work together to find a solution. Therefore, business success is not driven by your diploma, IQ test results, or any other performance-based metrics. EI characterizes a person's ability to recognize emotions both of other people and of himself. I believe that before you can lead and direct others, you need to understand your emotions. Therefore, EI is associated with self-knowledge. The result of high EI is self-knowledge. The ability to understand itself leads to greater happiness. A high level of happiness is an indicator of job satisfaction. Enjoying your work gives you the best results. Good results lead to recognition. Recognizing our successes makes us feel meaningful. This feeling leads us to greater happiness, better results.

**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.

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

### **Compulsory components of ERP**

**International programs and grants.** Research grants. State fund for fundamental research, Grants of NATO, U.S. Civilian Research & Development Foundation, Funds of European governments. Grants of International Agency for the development of culture, education and science (IADCES). Structural funds of EU. Scholarships for study and research. International European innovative scientific and technical program Eureka. International Visegrad Fund. Eurasia Foundation.

**Project approach in business management.** Business Management Systems and their combination. The project ideology and benefits of project approach to the business organization. The principles of project activities. Identification of the problems, which affect to success of projects. Model project-oriented behavior of business. The development of applied principles of project approach in business management.

**Project financing.** Theoretical principles of project financing. System of project financing organization. Project management in the project financing system. Evaluation of the effectiveness of investment projects in the project financing system. Sources of project financing. Cost and structure of investment resources in project financing. Features of organization of different 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 overall enterprise management system. Functions of management of marketing activity. Trends and concepts of marketing activity management. Marketing activity of the enterprise as a process. Organization and stages of marketing activities management.

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Tasks and stages of organization of marketing activity. Organizational structure of marketing activity management. Cross-functional coordination of enterprise units in the process of marketing functions. Marketing strategic planning. Control as a means of improving the effectiveness and efficiency of marketing activities. Management of marketing tools.

**Information technologies in project management:** The role and place of information systems and technologies in project management. Methods and methodology of information systems design in project planning. System-methodological aspects of modeling in project management. Requirements for project team and its manager, requirements for system analyst. Means of structural analysis. CASE technologies. Flow charts. Context diagrams. Professional and non-professional project management systems. Modern Microsoft Project 2010 project management software. Project resources in MS Project. Advanced MS Project features. Primavera Software Package. ConceptDraw software. MS Visio software. Project Expert software. CRM systems.

**Scrum, agile, MS Project in project management.** Agile is a program development approach that exposes the philosophy of the approach through four core values: people and interactions are more important than processes and tools; working program is more important than comprehensive documentation; cooperation with Customer is more important than negotiating contract terms; readiness for change is more important than going through the previous plan. Scrum is a project management methodology built on the principles of time management. Its main feature is involvement in the process of all participants, and each participant has its own role. The bottom line is that not only the team is working on solving 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 only mean constant control.

**Creative technologies in management of social projects.** 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 conditions of globalization. Management of individual factors: social perception, assessment of qualifications, skills, personalities, mentality, introspection, emotions and attitude to the organization. Motivation: needs, job design, career satisfaction. Equality theories, expectations and goal setting. Involvement of staff and increase of productivity. Group Factor Management and Social Processes: Effective Groups and Teams, Decision Making, Conflict and Negotiation Management, Communication in the Digital Age. Organization Performance Management. Contemporary leadership: situational, contextual and behavioral theories, charismatic and transactional leaders. Creation of creative enterprises capable of transformation based on new experience and requirements of competitive business environment.

*Optional Block 1 "Management of international projects"*

**Strategic Management of Agricultural Projects: A Business Game "Investment Policy of Agricultural Enterprises".** Business game as a means of modeling a situation in making management decisions on the formation of investment policy of agribusiness enterprises. Creation of several teams of players to solve a specific task of shaping the investment policy of agribusiness enterprises. Finding and justifying the choice of the best alternative investment activities and building on this basis the investment strategy of enterprises, determining the mechanisms for their implementation. Formation of a portfolio of investment projects. Assessment of investment policy effectiveness of agricultural enterprises. Presentation of the obtained results.

**Business game "Management of international projects in agribusiness".** Business game as a means of modeling the situation of management decision-making in

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management of international projects in agroindustrial complex. Setting up several teams of players to solve the problem of forming a set of strategic alternatives and justifying the choice of one of them in managing a specific international project in the agriculture. The initial conditions of the business game: the competitive position of the company, the tendencies of market development, which present the company, the strengths and weaknesses of the company and its competitors, the definition of competitive advantages and opportunities for their strengthening, the effectiveness of embedding an international project in the strategy of enterprise development. Identifying the terms and options for the project's resource support and selecting the best one. Presentation of the obtained results.

**Formation, management and development of the project team.** The need and principles of forming a project team. Methods and organizational aspects of team formation. The main characteristics of the project team. Organization of team interaction. Psychological features of project team management. Management of an international project team. Conflict management.

**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 | 1,5 year                    |
| – Part-time                                      | 1,5 year                    |
| Credits ECTS:                                    |                             |
| – educational and professional program           | 90                          |
| Language of teaching                             | Ukrainian, English, German  |
| Qualification of graduates                       | master degree in 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 training of highly qualified managers, able to creatively apply innovative methods in the field of logistics

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### 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 themes for master theses

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>1. 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  | Social responsibility  | 4                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional discipline 1  | 4                 | exam              |
| OB 2  | Optional discipline 2  | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 6  | Strategic Marketing  | 4                 | exam              |
| CC 7  | Logistics management   | 4                 | exam              |
| CC 8  | Advertising management   | 4                 | exam              |
| CC 9  | Marketing Management   | 4                 | exam              |
| CC 10   | Marketing planning   | 4                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |

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| 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 Optional by specialty</i>      |  |                   |                   |
| <i>Optional Block 1 "Advertising management"</i> |  |                   |                   |
| OB 1.1   | Creativity in advertising  | 4                 | exam              |
| OB 1.2   | Psychology of Advertising  | 4                 | exam              |
| OB 1.3   | Speechwriting  | 4                 | exam              |
| OB 1.4   | Brand Management   | 4                 | exam              |
| <i>Optional Block 2 "Trade marketing"</i>        |  |                   |                   |
| OB.2.1   | Organization and technology of wholesale and retail trade  | 4                 | exam              |
| OB 2.2   | E-commerce   | 4                 | exam              |
| OB 2.3   | Merchandising  | 4                 | exam              |
| OB 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>40</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 11  | Production and pre-diploma practice  | 12                | test              |
| CC 12  | Writing and defense of master thesis   | 14                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

## Annotations of disciplines in the curriculum

### 1. 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.

**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.

## 2. 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.

### Optional components of EPP

#### *Optional Block by 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.

## **FACULTY OF INFORMATION TECHNOLOGY**

**Dean** – Dr.Sc. in Pedagogics, associate professor Olena Glazunova  
Tel.: (044) 527-83-51  
E-mail: o-glazunova@nubip.edu.ua  
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 – Ds.Sc. in Economics, professor, Andrii Skrypnyk

Graduating department:

#### ***Economic Cybernetics***

Tel.: (044) 527-85-67

E-mail: ciber\_chair@nubip.edu.ua

Head of department – Ds.Sc. in Economics, professor, Andrii Skrypnyk

### **Specialty 121 "Software engineering"**

#### ***Educational programs "The software of information systems"***

Guarantor of the educational and professional program – Ph.D. in Engineering, associate professor Olekcii Tkachenko

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 – Ds.Sc. in Engineering, associate professor Viktor Bondarenko

#### ***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

**Specialty 123 "Computer engineering"**

***Educational programs "Computer systems and networks"***

Guarantor of the educational and professional program – Ph.D. in Engineering, associate professor Borys Husiev

Graduating department:

**Computer Systems and Networks**

Тел.: (044) 527-81- 99

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

Head of the department – Ds.Sc. in Engineering, professor Valerii Lakhno

**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 | 1,5 years                      |
| 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 Theses

1. Agricultural risks in terms of incompleteness institutional changes.
2. Risks evaluation of full scale agricultural sector taxation.
3. 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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 1.   | Global Economy   | 3                 | exam              |
| CC 2.   | Agrarian Policy  | 3                 | exam              |
| CC 3.   | Global Information Resources   | 4                 | exam              |
| CC 4.   | Methodology and organization of research on the basics of intellectual property                                      | 4                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 4                 | exam              |
| OB 2  | Optional subject 2   | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 5.   | Business Process Modeling  | 4                 | exam              |
| CC 6.   | Project management models  | 4                 | exam              |
| CC 7.   | Applied Econometrics   | 4                 | exam              |
| CC 8.   | Intellectual Data Analysis   | 4                 | exam              |
| CC 9.   | Risk management models   | 4                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional Block by specialty</i>              |  |                   |                   |
| <i>Optional Block 1 "Digital economy"</i>       |  |                   |                   |
| OB 1.1  | Blockchain technologies  | 4                 | exam              |
| OB 1.2  | Big Data Analytics   | 4                 | exam              |
| OB 1.3  | Modeling with R  | 4                 | exam              |
| OB 1.4  | Developing of Web Applications   | 4                 | exam              |
| <i>Optional Block 2 "Risk management"</i>       |  |                   |                   |
| OB 2.1  | Innovation agriculture risk  | 4                 | exam              |
| OB 2.2  | Methods and models of enterprise competitiveness management  | 4                 | exam              |
| OB 2.3  | Ecological and Economic Risks  | 4                 | 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   | Modeling and Forecasting in environmental management   | 4                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>34</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 10  | Internship   | 4                 |                   |
| CC 11  | Research practice  | 15                |                   |
| CC 12  | Preparation and defense of Master's work   | 13                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

### Annotations of subjects in the curriculum

#### 1. 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.

**Agrarian policy.** The economic essence, nature and main components of agricultural policy, certain measures of financial and credit, tax and price policies in the agricultural sector. Theoretical foundations of agricultural policy and agricultural policy of foreign countries and their blocs. Features of formation and main directions of Agrarian Policy of Ukraine.

**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.

#### 2. 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

*Optional Block by specialty*

*Optional Block 1 "Цифрова економіка"*

**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.

**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.

**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 | 1,5 years  |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of teaching                             | Ukrainian  |
| Qualification of graduates                       | Software engineer<br>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 for Master Theses**

1. Software for intelligent systems of classification of a vegetation state according to average resolution satellite data.
2. Software for agricultural accounting information system.

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>1. GENERAL TRAINING CYCLE</b>                                  |  |                   |                   |
| <b>Compulsory components of EPP</b>                               |  |                   |                   |
| CC 1  | Agrarian policy  | 4                 | exam              |
| CC 2  | Methodology and organization of scientific research  | 4                 | exam              |
| <b>Optional components of EPP</b>                                 |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>                      |  |                   |                   |
| OB 1  | Optional subject 1   | 4                 | exam              |
| OB 2  | Optional subject 2   | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                   |  |                   |                   |
| <b>Compulsory components of EPP</b>                               |  |                   |                   |
| CC 3  | Software project management  | 4                 | exam              |
| CC 3  | Digital signals and images processing  | 4                 | exam              |
| CC 5  | High-performance computer systems  | 4                 | exam              |
| CC 6  | Data warehousing   | 4                 | exam              |
| CC 7  | Software for embedded systems  | 3                 | exam              |
| CC 8  | The methods and information technologies for risk assessment   | 4                 | exam              |
| <b>Optional components of EPP</b>                                 |  |                   |                   |
| <i>Optional Block by specialty</i>                                |  |                   |                   |
| <i>Optional Block 1 "Programming methodology"</i>                 |  |                   |                   |
| OB 1.1  | Special math sections for programmers  | 4                 | exam              |
| OB 1.2  | Object modeling and design for complex systems   | 4                 | exam              |
| OB 1.3  | Patterns of object-oriented design and programming   | 4                 | exam              |
| OB 1.4  | Theory of formal languages and compiling   | 4                 | exam              |
| OB 1.5  | Methods of software formal specification and verification  | 4                 | exam              |
| <i>Optional Block 2 "Data science"</i>                            |  |                   |                   |
| OB 2.1  | Modeling and forecasting in environmental management   | 4                 | exam              |
| OB 2.2  | Big Data technology  | 4                 | exam              |
| OB 2.3  | Data Mining technology   | 4                 | exam              |
| OB 2.4  | Modeling with R  | 4                 | exam              |
| <i>Optional Block 3 "Intelligent systems"</i>                     |  |                   |                   |
| OB 3.1  | Artificial intelligence systems programming  | 4                 | exam              |
| OB 3.2  | Methods of expert systems building   | 4                 | exam              |
| OB 3.3  | Robotic management systems   | 4                 | exam              |
| OB 3.4  | Intellectual environmental monitoring systems  | 4                 | exam              |
| <i>Optional Block 4 "Embedded systems and Internet of Things"</i> |  |                   |                   |
| OB 4.1  | Robotic operating systems  | 4                 | exam              |
| OB 4.2  | Hardware and software for collecting and processing environmental information  | 4                 | exam              |
| OB 4.3  | Technologies of IoT systems designing  | 4                 | exam              |
| OB 4.4  | Protocols for data transferring in IoT 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 5 "Information security"</i>   |  |                   |                   |
| OB 5.1   | Administration and protection of databases and data warehouses   | 4                 | exam              |
| OB 5.2   | Computer methods of analysis and design of information security electronic means                                     | 4                 | exam              |
| OB 5.3   | Comprehensive systems of authorized access to information  | 4                 | exam              |
| OB 5.4   | Technologies of administration and operation of protected information and communication systems                      | 4                 | exam              |
| OB 5.5   | Artificial intelligence systems in the tasks of information protection   | 4                 | exam              |
| <i>Optional Block 6 "Information services"</i>   |  |                   |                   |
| OB 6.1   | Global information resources   | 4                 | exam              |
| OB 6.2   | Web applications development   | 4                 | exam              |
| OB 6.3   | Information services management  | 4                 | exam              |
| OB 6.4   | Methods and technologies of content management   | 4                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>32</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 9   | Internship   | <b>4</b>          | report            |
| CC 10  | Research on the topic of master's thesis   | <b>15</b>         | report            |
| CC 11  | Master's research work preparation and defense   | <b>15</b>         | work defence      |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

### Annotations of subjects in the curriculum

#### 1. GENERAL TRAINING CYCLE

##### Compulsory components of EPP

**Agrarian policy.** The economic essence character and main components of agricultural policy, specific measures of financial and credit, tax, pricing in the agricultural sector. Theoretical principles of agrarian policy and agrarian policy of some foreign countries and blocs. Features of formation and main directions of Agrarian Policy of Ukraine.

**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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Software project management.** The main subject of this discipline is the obtaining of 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 of 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.

**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.

**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.

**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 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.

**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.

### Optional components of EPP

*Optional Block by specialty*

*Optional Block 1 "Programming methodology"*

**Special math sections for programmers.** Additional mathematics sections required for data analysis, modeling, and applied monitoring tasks.

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**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.

**Methods of software formal specification and verification.** Basic concepts, methods and tools for software formal specification. Methods of program correctness proving. Temporal logic. Formal verification methods.

#### *Optional Block 2 "Data science"*

**Modeling and forecasting in environmental management.** 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.

**Big Data technology.** Big Data technologies let to handle large volumes of information accumulated by organizations and receive more informed management decisions on their base, better understand their customers and business processes. Introduction to large data systems. Description features data in real time. The use of tools. The ability to expand their knowledge and skills beyond traditional databases.

**Data Mining technology.** DataMining Technology, Data Mining techniques for solving classification, regression, associative search rules clustering. Use DataMining the construction of 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. Model search. Linear models. Nonlinear curve fitting. Self-starting models.

#### *Optional Block 3 "Intelligent systems"*

**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.

**Methods of expert systems building.** Main concepts of expert systems. Knowledge bases, production subsystem. Methods of forming expert recommendations. Tools for expert systems development.

**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.

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**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 4 "Embedded systems and Internet of Things"*

**Robotic operating systems.** Basic concepts and designation of robotic operating systems (ROS). ROS architecture. Standard and specialized ROS functions. Standard ROS services. User Packages ROS-pkg.

**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. Standards and technologies. Modern methods and technologies design of hardware and software IoT systems designing.

**Protocols for data transferring in IoT systems.** Interaction of components of IoT systems. Data transfer protocols. Features of data exchange in IoT systems. Levels of data exchange in IoT systems. Classification of protocols. Modern data transfer protocols using LoRaWAN, LoRa, HDSP technology, data and information transfer in modern wireless networks - GSM, 3G, 4G, etc Specificity of devices with different data transfer protocols to network.

*Optional Block 5 "Information security"*

**Administration and protection of databases and data warehouses.** Administration technologies and exploitation of protected information-communication systems, oriented on data processing. Organization of databases and warehouses. Database administration functions. Secrecy. 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 research 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 receiving. Classification of technical means of information exchange. Technical methods and means of information protection.

**Comprehensive systems of 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 for the protection of the CS. Development of security profile. ISO-7498-2 standard. Organization of authorized access at enterprises of any form of ownership. Basics of development an integrated system of authorized access. Automated access control systems.

**Technologies of administration and operation of protected information and communication systems.** Methods and means of local networks protecting when

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connected to public networks. Types of authentication: static, stable, permanent. Classification of identification and authentication systems. Authentication of users. Symmetric and asymmetric methods for authenticating the subject. Vulnerabilities in technology of one-time passwords. 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 6 "Information services"*

**Global information resources.** Basic concepts of information resources. Information systems and technologies. Main Internet resources. Digital libraries and databases. World market for information services. Trends in the development of world information technologies. Overview and comparative characteristics of modern ways of Internet access. Characterization of existing search engines for the use of Internet resources.

**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.

**Information services management.** Process-based approach to information service management. ITSM model based on process approach. Hewlett-Packard information systems management solution. ITSM reference model. IBM information systems management solution. ITPM information process model. IBM / Tivoli basic technologies. Microsoft's approach to building managed information systems. Microsoft management solutions for management.

**Methods and technologies of content management.** Learning requirements and rules for creating, operating and maintaining Web sites and large portals through the special systems for process management and content management. Basic content and web content management systems (CMS, WCMS). Methodology of modeling and development of software systems for content management and software.

**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 | 1,5 years                    |
| 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 for Master Theses

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's 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>1. GENERAL TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components of EPP</b>   |  |                   |                   |
| CC 1  | Agrarian Policy  | 3                 | 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> |  |                   |                   |
| OB 1  | Optional discipline 1  | 4                 | exam              |
| OB 2  | Optional discipline 2  | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                                     |  |                   |                   |
| <b>Compulsory components of EPP</b>   |  |                   |                   |
| CC 3  | Modelling and forecast in environmental sphere   | 3                 | exam              |
| CC 4  | Object modelling and designing of complex systems  | 3                 | exam              |
| CC 5  | Organization of data warehouse   | 4                 | exam              |
| CC 6  | Principles of distributed and network programming  | 4                 | exam              |
| CC 7  | Methods of expert systems  | 4                 | exam              |
| CC 8  | Big Data Technologies  | 3                 | exam              |
| CC 9  | Data Mining Technology   | 4                 | exam              |
| <b>OPTIONAL COMPONENTS OF EPP</b>   |  |                   |                   |
| <i>Optional block of choice by specialty</i>  |  |                   |                   |
| <i>Optional Block 1 "Computer monitoring environmental and economic processes"</i>  |  |                   |                   |
| OB 1.1  | Hardware and software for collecting and processing environmental information  | 4                 | exam              |
| OB 1.2  | Robot-technic Systems of Management  | 4                 | exam              |
| OB 1.3  | Intellectual environmental monitoring systems  | 4                 | exam              |
| <i>Optional Block 2 "Special Information Systems Software"</i>                      |  |                   |                   |
| OB 2.1  | High-performance computer systems  | 4                 | exam              |
| OB 2.2  | Software for embedded systems  | 4                 | exam              |
| OB 2.3  | Programming of Artificial Intelligence Systems   | 4                 | exam              |
| <i>Optional Block 3 "Internet of Things"</i>  |  |                   |                   |
| OB 3.1  | Technologies of IOT systems designing  | 4                 | exam              |
| OB 3.2  | Protocols for data transferring in IOT 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 4 "Data science"</i>           |  |                   |                   |
| OB 4.1   | Development of WEB applications  | 4                 | exam              |
| OB 4.2   | Patterns of object-oriented design and programming   | 4                 | exam              |
| OB 4.3   | Information systems management   | 4                 | exam              |
| OB 4.4   | Safety and reliability of computer systems   | 4                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>32</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 10  | Internship   | 5                 | test              |
| CC 11  | Research practice  | 15                | test              |
| CC 12  | Preparation of master's work   | 10                | test              |
| CC 13  | Defense of master's work   | 4                 |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

### Annotations of disciplines in the curriculum

#### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Agrarian policy.** The economic essence character and main components of agricultural policy, specific measures of financial and credit, tax, pricing in the agricultural sector. Theoretical principles of agrarian policy and agrarian policy of some foreign countries and blocs. Features of formation and main directions of Agrarian Policy of Ukraine.

**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.

#### 2. 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.

**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.



**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.

**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 receive more informed management decisions on their base, better understand their customers and business processes. Introduction to large data systems. Description features data in real time. The use of tools. The ability to expand their knowledge and skills beyond traditional databases.

**Technology Data Mining.** Data Mining Technology, Data Mining techniques for solving classification, regression, associative search rules clustering. Use Data Mining the construction of analytical systems.

### **Optional components of EPP**

#### *Optional Block by 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.

**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.

#### *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.

**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.** Interaction of components of IOT systems. Data transfer protocols. Features of data exchange in IOT systems. Levels of data exchange in IOT systems. Classification of protocols. Modern data transfer protocols using LoRaWAN, LoRa, HDSP technology, data and information transfer in modern wireless networks - GSM, 3G, 4G, etc. Specificity of devices with different data transfer protocols to network.

*Optional Block 4 "Data science"*

**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.

**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 | 1,5 years                    |
| 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 for Master Theses

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>1. GENERAL TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components of EPP</b>   |  |                   |                   |
| CC1   | Agrarian Policy  | 3                 | exam              |
| CC2   | 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> |  |                   |                   |
| OB 1  | Optional discipline 1  | 4                 | exam              |
| OB 2  | Optional discipline 2  | 4                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                                     |  |                   |                   |
| <b>Compulsory components of EPP</b>   |  |                   |                   |
| CC3   | Modelling and forecast in environmental sphere   | 3                 | exam              |
| CC4   | RS and technology processing geospatial data   | 4                 |                   |
| CC5   | Hardware and software for collecting and processing environmental information  | 4                 | exam              |
| CC6   | Object modelling and designing of complex systems  | 3                 | exam              |
| CC7   | Organization of data warehouse   | 4                 | exam              |
| CC8   | Data Mining Technology   | 4                 | exam              |
| CC9   | IT monitoring of environmental and socio-economic processes  | 3                 | exam              |
| <b>OPTIONAL COMPONENTS OF EPP</b>   |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>  |  |                   |                   |
| <i>Optional Block 1 "Computer monitoring environmental and economic processes"</i>  |  |                   |                   |
| OB 1.1  | Intellectual environmental monitoring systems  | 4                 | exam              |
| OB 1.2  | Robot-technic Systems of Management.   | 4                 | exam              |
| OB 1.3  | Simulation modeling of environmental processes   | 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 2 "Special Information Systems Software"</i> |  |                   |                   |
| OB2.1  | High-performance computer systems  | 4                 | exam              |
| OB2.2  | Software for embedded systems  | 4                 | exam              |
| OB2.3  | Programming of Artificial Intelligence Systems   | 4                 | exam              |
| <i>Optional Block 3 "Internet of Things"</i>                   |  |                   |                   |
| OB3.1  | Technologies of IOT systems designing  | 4                 | exam              |
| OB3.2  | Protocols for data transferring in IOT systems   | 4                 | exam              |
| <i>Optional block 4 "Data science"</i>                         |  |                   |                   |
| OB4.1  | Development of WEB applications  | 4                 | exam              |
| OB4.2  | Patterns of object-oriented design and programming   | 4                 | exam              |
| OB4.3  | Information systems management   | 4                 | exam              |
| OB4.4  | Safety and reliability of computer systems   | 4                 | exam              |
| <b>The total amount of compulsory components</b>               |  | <b>32</b>         |                   |
| <b>The total amount of optional components</b>                 |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                              |  |                   |                   |
| CC10   | Internship   | 5                 | test              |
| CC11   | Research practice  | 15                | test              |
| CC12   | Preparation of master's work   | 10                | test              |
| CC13   | Defense of master's work   | 4                 |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                                 |  | <b>90</b>         |                   |

### Annotations of subjects in the curriculum

#### 1. GENERAL TRAINING CYCLE

##### Compulsory components of EPP

**Agrarian policy.** The economic essence character and main components of agricultural policy, specific measures of financial and credit, tax, pricing in the agricultural sector. Theoretical principles of agrarian policy and agrarian policy of some foreign countries and blocs. Features of formation and main directions of Agrarian Policy of Ukraine.

**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.

#### 2. 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 Technology.** Data Mining Technology, Data Mining techniques for solving classification, regression, associative search rules clustering. Use Data Mining the construction of analytical systems.

**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.

### **Optional components of EPP**

#### *Optional Block by 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.

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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.** Interaction of components of IOT systems. Data transfer protocols. Features of data exchange in IOT systems. Levels of data exchange in IOT systems. Classification of protocols. Modern data transfer protocols using LoRaWAN, LoRa, HDSP technology, data and information transfer in modern wireless networks - GSM, 3G, 4G, etc. Specificity of devices with different data transfer protocols to network.

*Optional Block 4 "Data science"*

**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.

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**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.

**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 | 1,5 years                      |
| 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, and educational activities in the field of the creation and operation of computer systems and networks hardware and software.

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

The purpose of the educational and professional program is to train qualified, competitive specialists for research, project, technological and organizational-management activities in the field of design and operation of computer systems and networks. The 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 research of hardware and software for computer systems and networks .

In the field of educational activity, the main goal is the formation of a future specialist of 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 the already implemented computer system operation.

The training of masters in computer systems and networks in the field of technical means of computer technology allows a specialist 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 specialist both as a professional and a system programmer and to independently develop and use system mathematical support, 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.

**Areas of employment of graduates**

The graduate can analyze the problem area at the systemic and structural levels of design and support related to the development and maintenance of both individual

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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 positions of: 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 on 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 in such systems.

### Proposed Topics for Master theses

1. Hardware and software means of information protection in computer systems.
2. Specialized function-oriented computer system for solution of specific problems in a particular subject area.
3. Designing of GIS hardware and software.
4. Development of system software of computer systems.
5. Development of hardware and software of information protection facilities in computer systems.
6. Intelligent computer monitoring system of the environment.
7. Microcontrol system of monitoring and management of agricultural objects.
8. Specialized control system of technological processes of agro-industrial enterprise.
9. Development of network applications of specialized computer systems IOT.

### Curriculum of Master 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>1. GENERAL TRAINING CYCLE</b>                |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 1.   | Agrarian policy  | 3                 | exam              |
| CC 2  | Methodology of research  | 4                 | exam              |
| <b>Optional components of EPP</b>               |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                   |
| OB 1  | Optional subject 1   | 4                 | exam              |
| OB 2  | Optional subject 2   | 3                 | exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                   |
| <b>Compulsory components of EPP</b>             |  |                   |                   |
| CC 3.   | Theory and design of computer systems and networks   | 5                 | exam              |
| CC 4.   | Computer systems programming technologies  | 4                 | exam              |
| CC 5.   | Information protection in computer systems and cyber security  | 8                 | exam              |
| CC 6.   | Visualization and pattern recognition systems  | 4                 | exam              |
| CC 7.   | Intellectual data analysis   | 5                 | exam              |
| <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 |
|--|--|-------------------|-------------------|
| Optional Block by specialty  |  |                   |                   |
| Optional Block 1 "Internet of Things"                                    |  |                   |                   |
| OB 1.1.  | Robotic operating systems  | 5                 | exam              |
| OB 1.2.  | Technologies of IOT systems designing  | 4                 | exam              |
| OB 1.3.  | Protocols for data transferring in IOT systems   | 4                 | exam              |
| OB 1.4.  | Information technologies for monitoring and simulation of the environment  | 4                 | exam              |
| OB 1.5   | Computer systems of artificial intelligence  | 4                 | exam              |
| Optional Block 2 "Computer systems and networks protection technologies" |  |                   |                   |
| OB 2.1.  | Administration and protection of databases and data warehouses   | 5                 | exam              |
| OB 2.2.  | Computer methods of analysis and design of information security electronic means                                     | 4                 | exam              |
| OB 2.3.  | Comprehensive systems of authorized access to information  | 4                 | exam              |
| OB 2.4.  | Technologies of administration and operation of protected information and communication systems                      | 4                 | exam              |
| OB 2.5.  | Artificial intelligence systems in the tasks of information protection   | 4                 | exam              |
| Optional Block 3 "Computer Systems Software"                             |  |                   |                   |
| OB 3.1.  | Methods of expert systems construction   | 4                 | exam              |
| OB 3.2.  | Web Application Development  | 4                 | exam              |
| OB 3.3.  | Hardware and software tools for information collection and processing  | 4                 | exam              |
| OB 3.4.  | Intelligent environmental monitoring systems   | 4                 | exam              |
| OB 3.5.  | Robotic control systems  | 4                 | exam              |
| OB 3.6.  | Management of information services   | 4                 | exam              |
| OB 3.7.  | Programming of Artificial Intelligence Systems.  | 4                 | exam              |
| OB 3.8.  | High-performance computer systems  | 4                 | exam              |
| OB 3.9.  | Digital signal and image processing  | 4                 | exam              |
| OB 3.10.   | Embedded systems Software  | 4                 | exam              |
| Optional Block 4 "Data Analysis in Computer Systems"                     |  |                   |                   |
| OB 4.1.  | Modeling and forecasting in the field of nature management   | 4                 | exam              |
| OB 4.2.  | Big Data technologies  | 4                 | exam              |
| OB 4.3.  | Data Mining Technologies   | 4                 | exam              |
| OB 4.4.  | Modeling with R  | 4                 | exam              |
| The total amount of compulsory components                                |  | 33                |                   |
| The total amount of optional components                                  |  | 23                |                   |
| 3. OTHER TYPES OF TRAINING   |  |                   |                   |
| CC 8   | Internship   | 4                 | credit            |
| CC 9   | Research practice  | 15                | credit            |
| CC 10  | Preparation and defense of Master's Thesis   | 15                |                   |
| THE TOTAL AMOUNT OF EPP  |  | 90                |                   |

### **Annotations of subjects in the curriculum**

#### **1. GENERAL TRAINING CYCLE Compulsory components of EPP**

**Agrarian policy.** The economic essence, nature and main components of agricultural policy, certain measures of financial and credit, tax and price policies in the agricultural sector. Theoretical foundations of agricultural policy and agricultural policy of foreign countries and their blocs. Features of formation and main directions of Agrarian Policy of Ukraine.

**Methodology of research.** 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.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Theory and design of computer systems and networks.** System and functional design of computer systems (CS). Technical design of the CS. Methods and algorithms for 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). Methodology of CN designing. Organization of information exchange in the CS. Process planning. Simulation of real-time computer information systems. Optimization of information flows in the CN.

**Computer systems programming technologies.** Basic concepts of programming technology. Life Cycle Software Development Standards. Programming methods. Modern software development models. Software design tools. Variety of environments to solve problems of software components interaction. Methods of specification of programs, interfaces and systems. Object-Oriented Visual Programming. Data classes. CASE is a means of supporting a structured approach to software design. The technology of the implementation of CASE-tools. Data abstraction classes.. Classes that depend on the state. Classes that hide algorithms. User interface classes.

**Information protection in computer systems and cyber security.** The basics of information protection. The task of information protecting. The procedure for performing work on the protection of information. Classification of methods and means of information protection. Channels of unauthorized information receiving. Concept of the channel of unauthorized receiving of information. 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 graphic objects basic classes. Classification systems and features of image input and imaging tools. Graphic Data Descriptive Standards. Coordinate systems 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. Image enhancement and their features, image filtering. Binarization and image preparation problems. Methods for 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

#### *Optional Block by specialty*

#### *Optional Block 1 "Internet of Things"*

**Robotic operating systems.** Basic concepts and designation of robotic operating systems (ROS). ROS architecture. Standard and specialized ROS functions. Standard ROS services. User Packages ROS-pkg.

**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.** Interaction of components of IOT systems. Data transfer protocols. Features of data exchange in IOT systems. Levels of data exchange in IOT systems. Classification of protocols. Modern data transfer protocols using LoRaWAN, LoRa, HDSP technology, data and information transfer in modern wireless networks - GSM, 3G, 4G, etc Specificity of devices with different data transfer protocols to network.

**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. Basic 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 research 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. Knowledges and knowledges 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 and tools for creation of SAI: 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 data processing. Organization of databases and warehouses. Database administration functions. Secrecy. 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 research 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 receiving. Classification of technical means of information exchange. Technical methods and means of information protection.

**Comprehensive systems of 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 for the protection of the CS.

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Development of security profile. ISO-7498-2 standard. Organization of authorized access at enterprises of any form of ownership. Basics of development an integrated system of authorized access. Automated access control systems.

**Technologies of administration and operation of protected information and communication systems.** Methods and means of local networks protecting 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 authenticating the subject. Vulnerabilities in technology of one-time passwords. 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.** 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.

**Hardware and software tools for information collection and processing.** 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.

**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.

**Robotic control 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.

**Management of information services.** 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.

**Programming of Artificial Intelligence Systems.** 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.

**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.

**Digital signal and image 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.

**Embedded systems Software.** 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.

#### *Optional Block 4 "Data Analysis in Computer Systems"*

**Modeling and forecasting in the field of nature management.** 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.

**Big Data Technologies.** Big Data technologies let to handle large volumes of information accumulated by organizations and receive more informed management decisions on their base, better understand their customers and business processes. Introduction to large data systems. Description features data in real time. The use of tools. The ability to expand their knowledge and skills beyond traditional databases.

**Data Mining Technologies.** Data Mining Technology, Data Mining techniques for solving classification, regression, associative search rules clustering. Use DataMining the construction of 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. Model search. Linear models. Nonlinear curve fitting. Self-starting models.

## **FACULTY OF HUMANITIES AND PEAGOGY**

**Dean** – Doctor of Philology, Professor Shynkaruk Vasyl Dmytrovych

Tel.: (044) 527-80-83

E-mail: pedagogy\_dean@twin.nubip.edu.ua

Location: Building № 3, Room 101

The faculty organizes and coordinates the educational process of bachelors in the following specialties:

### **Speciality 011 "Educational and pedagogical sciences"**

#### ***Educational program "Pedagogy of Higher School"***

Guarantor of the educational and professional program – Associate professor Ruslan Sopivnyk, Doctor of Pedagogical

Tel: (044) 527-83-55

E-mail: pedagogic@ukr.net

#### ***Educational program "Information and communication technologies in education"***

Guarantor of the educational and professional program – Associate professor Alexander Kuchay, Doctor of Pedagogical

Tel: (044) 527-83-55

E-mail: pedagogic@ukr.net

Graduate Department:

#### **Pedagogy**

Tel: (044) 527-83-55

E-mail: pedagogic@ukr.net

Head of Department – Associate professor Ruslan Sopivnyk, Doctor of Pedagogical

### **Speciality 035 "Phylology"**

#### ***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 Lychuk Mariia Ivanivna

Tel.: (044) 527-85-95

E-mail: krgm@ukr.net

Graduating Departments:

#### **Romano-Germanic languages and translation**

Tel.: (044) 527-85-95

E-mail: krgm@ukr.net

Head of department – Doctor of Pedagogy, Professor Kravchenko Nataliya Kymivna

***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 – Doctor of Pedagogy,  
Professor Amelina Svitlana Mykolaivna  
Tel.: (044) 527-88-46  
E-mail: kifip@ukr.net

Graduating Departments:

**Foreign Philology and Translation**

Tel.: (044) 527-88-46

E-mail: kifip@ukr.net

Head of department – Doctor of Pedagogy, Professor Amelina Svitlana Mykolaivna

**Speciality 053 "Psychology"**

***Educational program "Psychology"***

Guarantor of the educational and professional program – Martinuk Irina Anatoliyivna,  
candidate of psychological sciences, associate professor  
Tel.: (044) 527-83-54  
E-mail: marteirene@ukr.net

Graduating Departments:

**Psychology**

Tel.: (067) 696-53-70

E-mail: shmargun2012@ukr.net

Head of department – Head of the Department – Doctor in psychology, Professor  
Shmargun Vitaly

**Speciality 073 "Management"**

***Educational program "Management of educational institution"***

Guarantor of educational and professional program is the Candidate of Pedagogical  
Sciences, Professor Kubitskyi Serhii Olehovych  
Tel.: (044) 527-83-56  
E-mail: metod\_dep@nubip.edu.ua

***Educational program "Human Resources Management"***

Guarantor of educational and professional program is the Doctor of Pedagogical  
Sciences, Professor Nikolaienko Stanislav Mykolaiovych  
Tel.: (044) 527-83-56  
E-mail: metod\_dep@nubip.edu.ua

Graduation Department:

**Management and Educational Technologies**

Tel.: (044) 527-83-56

E-mail: metod\_dep@nubip.edu.ua

The head of the department is the Candidate of Pedagogical Sciences, Professor  
Kubitskyi Serhii Olehovych.

**Speciality 231 "Social Work"**

***Educational program "Social and psychological rehabilitation"***

Guarantor of the educational and professional program – Doctor of Pedagogical Sciences, Associate Professor Sopivnyk I.V.

Tel.: (044) 527-80-73

E-mail: irvisop@meta.ua

***Educational program "Social Work"***

Guarantor of the educational and professional program – Doctor of Pedagogical Sciences, Associate Professor Tarasenko R.O.

Tel.: (044) 527-80-73

E-mail: r\_tar@nubip.edu.ua

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 Iryna V. Sopivnyk



**Training of masters of sciences  
branch of knowledge "Education/Pedagogy"  
speciality 011 "EDUCATIONAL AND PEDAGOGICAL SCIENCES"  
in educational program "PEDAGOGY OF HIGHER SCHOOL"**

|  |  |
|--|--|
| Form of Training:                                | Licensed number of persons:                |
| – Full-time                                      | 40   |
| – Part-time                                      | 35   |
| Duration of training                             |  |
| – Full-time educational and professional program | 1,5 year                                   |
| – Part-time                                      | 1,5 year                                   |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of teaching                             | Ukrainian                                  |
| Qualification of graduates                       | teacher of higher educational institutions |

### **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.

### **Graduate Employment Areas**

A graduate with the qualification "teacher of a higher education institution" can work in the following positions: assistant, methodologist, lecturer, organizing teacher, scientific researcher in the field of education, scientific researcher-consultant (teaching methods), teacher in higher education institutions, vocational schools, institutions of professional before higher education.

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

#### ***Optional Block "Agro and economic"***

The sampling unit provides mastering of a future expert of such a complex

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academic subjects of special (professional) training, as the "agrarian policy", "the World economy", "Sustainable development of agriculture", "Organization of project activities", "Entrepreneurial activities".

Goal is the study of historical aspects of development of theory and methods of teaching of agro-economic disciplines; understanding of laws, principles, forms, methods and means of training, development or maintenance and system control and evaluation of learning outcomes; improvement, design and modeling of the educational content of disciplines; applications of theory and technique of practical training; planning, organization of educational process in institutions of higher education.

Discipline of that sample block give the opportunity to acquire methodological bases of development and realization of measures on support and development of agriculture in the system of inter-industry linkages in the national economy; to form the seekers of higher education of fundamental knowledge about functioning of the world economy; a system of theoretical and practical knowledge of sustainable development strategies in agriculture; to develop management competence in the organization of project activities; learn skills in organizing and managing their own business, skills to use the tools of management and marketing in entrepreneurship, to create entrepreneurial thinking.

#### ***Optional Block "Philosophical and psychological"***

The sampling unit provides mastering of a future expert of such a complex academic subjects of special (professional) training, as "developmental psychology", "Pedagogical psychology", "Psychology of success", "Psychology of conflict" and "Philosophy of education".

The purpose is the study of historical aspects of development of theory and methods of teaching of philosophical and psychological disciplines; understand 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 system of modern knowledge about the regularities of mental development and character formation at different stages of her life and skills to apply this knowledge in future practice; master theory, the peculiarities of pedagogical activity, and practical methods of problem solving learning, teaching, education of the person; to create understanding of the concept of "success", to build own program success, and program future students to set goals and to counteract the negative consequences associated with not achieving success; to foster the ability to manage conflicts in different spheres of activity, control conflict interaction; reveal the specific nature of education as a phenomenon of culture and social institution in its historical and socio-cultural dynamics; to deepen the study of the current socio-philosophical problems of modern education, to develop their own vision of education to raise the General cultural level as a component of professional training of the teacher and methodological basis for the practical activities.

#### ***Optional Block "Educational cycle"***

The sampling unit provides mastering of a future expert of such a complex academic subjects of special (professional) training as "teaching skills and ethics of teacher in higher education", "Educational measurement", "Valeo Cybernetics", "Inclusive education", "Informal education", "Dual education", "Formation of corporate culture", "Business coaching".

The purpose is the study of historical aspects of development of theory and

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methods of teaching educational cycle; understanding of 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 content and components of pedagogical skills of the teacher, the principles and norms of educational research ethics specialist (the teacher and the head of the institution of higher education); essence of corporate culture and its significance in the development of the individual and the organization in which it operates; provide an in-depth theoretical knowledge regarding the understanding of educational measurement, form and skills of their conduct; to master the methods, tools and skills to manage their own health and the health of future students as a systematic and controllable process; to establish a system of values inclusive education knowledge and skills in the sphere of organization and implementation of inclusive education of children with special educational needs; to master the complex knowledge, beliefs and ideas that justify the direction and the terms of use of forms and methods of non-formal education and dual forms of vocational education as successfully adapted to the conditions of the market economy of educational phenomena based on social partnership; to master the basic technology and tools of business coaching that will contribute to the solution of practice-oriented problems in the field of psychological-pedagogical support of the individual and the organization.

### ***Optional Block "Methodical"***

The sampling unit provides mastering of a future expert of such a complex academic subjects of special (professional) training, as "the Technique of personnel training", "methods of formation of the team," "Methods of work of the mentor group", "Organization of practical training", "Methodology of creating e-learning courses".

The purpose is the study of historical aspects of development of theory and methods of teaching; understanding 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 the polling unit enable the seekers of higher education to establish a system of knowledge which related to the deliberate influence on the development of the staff of the organization (UNIVERSITY, firms) to ensure the effective functioning of the organization, its competitiveness in the market, enrichment of professional, intellectual, creative and cultural potential of employees; to master the technique of working with the team, practices his formation and organization of work with different categories of participants; to master the methods of work of the mentor group on the formation of the student group, the organization and conduct of educational activities features activities of the teacher during vocational and practical training; master the technique of creating e-learning courses, especially the organization of the educational process, the role of a tutor and the success factors of e-learning.

### **Practical training**

Practical training is carried out according to the schedule of the educational process directly on the certified base of practice, among which are: vocational schools, vocational institutions in front of higher education and higher education institutions. Vocational training provides on the basis of the listed educational institutions: practical training practice and internship; industrial research practice. Provides for the preparation,

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publication and testing of scientific and methodological works in the specialty.

**Indicative topics of master's work**

1. The formation of civic qualities of students of agricultural higher educational institutions.
2. Methodology for the implementation of the leadership potential of students of agricultural educational institutions.
3. Pedagogical conditions for the organization of student self-government in agricultural institutions of higher education.
4. Methods of teaching agricultural disciplines in agricultural institutions of higher education.
5. The formation of the value worldview of the personality of applicants for education in agricultural universities.
6. Methods of educational work of the educator in a student dormitory.
7. The use of innovative technologies in the educational process of institutions of higher education.
8. The use of interactive teaching methods in the training of students of agricultural higher educational institutions.
9. Ways of formation of pedagogical skills in future teachers of higher educational institutions.
10. Methods of monitoring and evaluating the results of educational and cognitive activities of students of agricultural higher educational institutions.
11. The application of technology of problematic education in the process of studying special disciplines.

**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  |
|---|--|-------------------|--------------------|
| <b>1. GENERAL TRAINING CYCLE</b>                |  |                   |                    |
| <b>Compulsory components of EPP</b>             |  |                   |                    |
| CC 1  | Business foreign language  | 6                 | exam               |
| CC 2  | Head of educational institution  | 4                 | offset, exam       |
| <b>Optional components of EPP</b>               |  |                   |                    |
| <i>Optional subjects by Student's Choice</i>    |  |                   |                    |
| OB 1  | Optional discipline 1  | 4                 | exam               |
| OB 2  | Optional discipline 2  | 4                 | exam               |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b> |  |                   |                    |
| <b>Compulsory components of EPP</b>             |  |                   |                    |
| CC 3  | Pedagogy of high school  | 6                 | 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.                                | 4                 | exam               |
| CC 6  | The formation of the value worldview of the individual   | 4                 | exam               |
| CC 7  | Інформаційні технології в навчанні   | 4                 | exam               |
| CC 8  | Methods of teaching agricultural disciplines   | 6                 | exam               |
| <b>Optional components of EPP</b>               |  |                   |                    |
| <i>Optional Block by choice of specialty</i>    |  |                   |                    |
| <i>Optional Block 1 "Agro and economic"</i>     |  |                   |                    |
| OB 2.1.   | Agricultural policy  | 4                 | exam               |

| Code n/a   | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control |
|--|--|-------------------|-------------------|
|  | World economy  |                   |                   |
|  | Sustainable development of the A I IC  |                   |                   |
|  | The organization of project activities   |                   |                   |
|  | Business activities  |                   |                   |
| Optional Block 2 "Philosophical and psychological" |  |                   |                   |
| OB 2.2.  | Age-related psychology   | 4                 | exam              |
|  | Pedagogical psychology.  |                   |                   |
|  | The psychology of success.   |                   |                   |
|  | Psychology of conflicts.   |                   |                   |
|  | Philosophy of Education.   |                   |                   |
| Optional Block 3 "Induction cycle"                 |  |                   |                   |
| OB 2.3.  | Pedagogical excellence and ethics of the teacher of higher education   | 4                 | exam              |
|  | Educational-dimension  |                   |                   |
|  | Valeocybernetics.  |                   |                   |
|  | Inclusive education  |                   |                   |
|  | Non-formal education   |                   |                   |
|  | Dual education.  |                   |                   |
|  | Formation of corporate culture   |                   |                   |
|  | Business coaching  |                   |                   |
| Optional Block 4 "Methodical"                      |  |                   |                   |
| OB 2.4.  | Methodology of staff training  | 4                 | exam              |
|  | Methodology of team formation  |                   |                   |
|  | The methodology of the mentor of the group.  |                   |                   |
|  | Organization of practical training   |                   |                   |
|  | Methodology for creating electronic training courses   |                   |                   |
| The total amount of optional components            |  | 38                |                   |
| The total amount of compulsory components          |  | 24                |                   |
| 3. OTHER TYPES OF TRAINING                         |  |                   |                   |
| CC 9.  | Practical training   | 16                |                   |
| CC 10.   | Preparation and defense of master's works  | 12                |                   |
| THE TOTAL AMOUNT OF EPP                            |  | 90                |                   |

### Annotations of subjects in the curriculum

#### 1. 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.

#### 2. 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 socio-economic formations.

**The formation of the value worldview of the individual.** Conceptual foundations of the organization of work on the formation of the value worldview of the individual. Diagnostics of personality and collective of student group. The use of collective tools in the process of influencing the consciousness and behavior of students. Innovative and interactive forms and methods of educating students' value worldview. The formation of leadership qualities and soft skills of applicants for higher education in various forms of student self-government. The role of the institution of mentoring in the system of subject-subject interaction of participants in the educational process. Practical advice on the formation of the value worldview of a student in agricultural institutions of higher education.

**Information technology in training.** The place and role of information technology in the organization of training, the organizational basis for the application of information technology in research, the construction of an information system and the planning of scientific work.

**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 forms of labor organization and the main directions for their improvement, the basics of agricultural calculation and other.

### **Optional components of EPP**

*Optional Block by choice of specialty*

*Optional Block 1 "Agricultural and economic"*

**Agricultural policy.** Methodological and methodological foundations of the development and implementation of measures to support and ensure the development of agriculture in the system of intersectoral relations in the national economy; the formation of the skills of scientific and analytical study of the problems of the agricultural sector from the standpoint of national interests and the interests of agricultural producers; development of skills to evaluate the effectiveness of agricultural policy and to justify the choice of certain measures of state regulation.

**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 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

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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.

**Sustainable development of the A I IC.** Preparation of modern specialists of the agricultural sector to a practical mastery of methods, indicators and principles of sustainable development of agriculture, their skillful application in practice. The task of the discipline: introduction to the Genesis and historical aspects of sustainable development; study of the peculiarities of sustainable development of Ukrainian agriculture at the present stage and use in practice indicators and methods of sustainable development.

**The organization of project activities.** The development of management competencies in the organization of project activities. The subject of discipline are the specific mechanisms, processes and instruments of implementation, monitoring and evaluation of project activities by the project team. The objective of the course: understanding of basic principles of project initiation, structuring it, economic study of the feasibility of implementation; mastering the skills of planning and execution of project activities in the areas of project integration, scope management, time, cost, quality, human resource, communications, risk and procurement.

**Business activities.** Formation of system of base knowledge on the organization, functioning and legal regulation of business activity, management of your business; master the tools of management and marketing in entrepreneurship, formation of entrepreneurial thinking and economic culture.

#### *Optional Block 2 “Philosophical and psychological”*

**Age-related psychology.** Mastering the system of modern knowledge about the concept, principles, concepts of developmental psychology; patterns of mental development and personality formation at different stages of his life and the skills of applying this knowledge in future practice; practical training of students to work with people of different age categories. Competence in questions of developmental psychology will allow future specialists at a high level to carry out educational, psychodiagnostic, advisory, correctional and rehabilitation and development work.

**Pedagogical psychology.** The patterns of human mental activity in the process of development, education and training; general psychological patterns of personality formation by the targeted implementation of the pedagogical process, its age and individual specificity. Psychological patterns and individual differences in the acquisition of knowledge, skills; formation of personality; changes in the psyche of the child caused by training and education. Knowledge, skills necessary for effective work with children of different age groups, parents, teachers, educators.

**The psychology of success.** The range of key issues related to the concept of success, its components, prerequisites and methods of achievement, evaluation criteria. The purpose of the course is to form students' understanding of the concept of “success”, teach them how to build their own success programs, set goals and counteract the negative consequences associated with not achieving success.

**Psychology of conflicts.** The formation and development of students' skills and abilities to solve specific problems of conflict management in various fields of activity. The purpose of the course is to combine the methodology, theory and practice of conflict interaction into an integrated structure and to illuminate in the mainstream of psychological practice. The task is to teach students the theory and practice of controlling conflict interaction, to develop skills for resolving conflicts in the business and professional spheres, private life, to form thinking, oriented towards understanding, mutual assistance, cooperation and joint problem solving.

**Philosophy of Education.** The generalization of the knowledge of masters in

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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.

*Optional Block 3 "Induction cycle"*

**Pedagogical excellence** and ethics of the teacher of higher education. The content and components of the teacher's pedagogical skills, principles and norms of the scientific and pedagogical ethics of a specialist (teacher and head of a higher education institution). Students' awareness of the creative nature of pedagogical work, requirements for professionally significant qualities of teachers; the 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 activity and the ways of professional self-improvement; familiarization with the norms and principles of scientific and professional ethics.

**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.

**Valeocybernetics.** Mastering the methods, tools and skills of managing their own health and the health of future pupils as a systemic and controlled process. Valeo cybernetics is an integral discipline that combines knowledge of valeology and cybernetics as the science of managing complex systems. The course contains knowledge reflecting the interaction of the science of health and a healthy lifestyle with biomedical sciences. Cybernetic methods for the analysis of biological systems and process control in the human body (including the tasks of automating diagnostics and treatment, the introduction of computer methods in the work of medical personnel) and in socio-economic systems for protecting public health are considered

**Inclusive education.** The assimilation of theoretical and methodological, regulatory and organizational and methodological foundations of inclusive education. Formation of the value system of inclusive education, knowledge and skills in the field of organization and implementation of inclusive education for children with special educational needs. The acquisition of practical skills in the field of inclusive education for children with special educational needs, the development of competencies: worldview, civic, communicative, interpersonal interaction, self-educational; psychological and pedagogical, methodological, specially pedagogical, consultative, deontological, etc.

**Non-formal education.** Mastering a complex of knowledge, views and ideas that justify the directions and conditions for using the forms and methods of organizing non-formal education. The theoretical justification of non-formal education as an important area of modern education and the acquisition by future specialists of competencies in the field of non-formal education for various categories. Formation and experience in organizing non-formal education in Ukrainian and international socio-pedagogical practice; teaching students to master the main forms, methods and techniques of informal educational activities; the formation of a positive attitude towards non-formal education technologies.

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**Dual education.** Mastering a complex of knowledge, views and ideas that justify the directions and conditions for using the forms and methods of organizing the dual form of vocational education, an educational phenomenon successfully adapted to the conditions of a market economy based on social partnership. Formation of an understanding of dual education at masters as a form of training, ensures the development of such personal qualities as the ability to work in a team, the skills of the optimal choice of technological solutions, responsibility for the assigned area of activity; understanding of the essence of dual education as a system, which is a social partnership of a professional school and an educational enterprise. Awareness of the new role of the teacher in the implementation of the dual program and the acquisition of Student Adviser competencies (consultant or curator). Training in ways to attract employers to the process of forming an order for the preparation of graduates and training in the educational professional program.

**Formation of corporate culture.** The essence of corporate culture and its significance in the development of the individual and the organization in which she works. The ability to form the corporate culture of the enterprise and make informed, optimal decisions on the development of culture, the result of which is the conduct of effective economic activity of the enterprise. The purpose of teaching a discipline is to learn the basics of organizational culture, as well as to clarify the place of this discipline as part of the modern theory of business management. The development of the ability to navigate the socio-economic processes that form national traditions, lifestyle and mentality, familiarization with the methodology of a comprehensive study of organizational culture, involves a polydisciplinary synthetic approach to the problem, as well as enriching the general culture and thinking skills of students.

**Business coaching.** Mastering the basic technologies and tools of business coaching, which will contribute to solving practice-oriented problems in the field of psychological pedagogical support of an individual and organization. The objective of the course: mastering the knowledge of the psychological laws of the work of a coach to achieve a clearly defined 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; Unleashing the student's creativity to access ideas that open up innovative opportunities. Acquaintance with the best practices and models of life and business coaching: coaching a new business; business transformation; business finance coaching, corporate standards development, selection and inheritance of foreign experience; coaching with a profitable partnership; on building business relations; marketing coaching; HR management; with effective advertising; pricing strategies and the like.

#### *Optional Block 4 "Methodical"*

**Methodology of staff training.** The formation of a system of knowledge related to the targeted impact on the development of the organization's personnel (university, enterprise, company) to ensure the effective functioning of the organization, its competitiveness in the market, enrichment of the professional, intellectual, creative and cultural potential of employees.

**Methodology of team formation.** Mastering the methodology of working with the team, the practice of its formation and organization of work with various categories of participants.

**The methodology of the mentor of the group.** Mastering the methodology of the mentor of the group on the formation of the student team, the organization and conduct of educational events.

**Organization of practical training.** Mastering the characteristics of the teacher during professional training.

**Methodology for creating electronic training courses.** Mastering the methodology of creating electronic training courses, understanding the features of the organization of the educational process, the role of tutor and success factors of e-learning.

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**Training of masters of sciences  
branch of knowledge "Education/Pedagogy"  
speciality 011 "EDUCATIONAL AND PEDAGOGICAL SCIENCES"  
in educational program "INFORMATION AND COMMUNICATION  
TECHNOLOGIES IN EDUCATION"**

|  |  |
|--|--|
| Form of Training:                                | Licensed number of persons:                |
| – Full-time                                      | 35   |
| – Part-time                                      | 30   |
| Duration of training                             |  |
| – Full-time educational and professional program | 1,5 year                                   |
| – Part-time                                      | 1,5 year                                   |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of teaching                             | Ukrainian                                  |
| Qualification of graduates                       | teacher of higher educational institutions |

### **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.

### **Graduate Employment Areas**

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.

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

#### ***Optional Block "Psychological and pedagogical"***

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 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

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Ethics. Ethics 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 "Educational, information and communication"***

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 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 "Informative"***

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 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 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

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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 "Philosophical and Economic"***

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 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).

### **Indicative topics of master's work**

1. Organizational and pedagogical conditions of interpersonal interaction in the virtual educational space.
2. Mobile technology as a means of communicative development of a modern teacher.
3. The development of information competence by means of mobile technologies
4. Information and communication technologies as a means of forming a technological worldview.
5. The development of students' interest in the educational tool for educational web quests.
6. Formation of end-to-end reading skills with understanding by means of visualization.
7. Use of Google applications for practical ICT in education
8. Introducing an integrative approach to e-learning
9. The formation of communicative competencies through case technology.
10. Development of the information culture of education applicants by means of Internet services
11. Augmented reality as a means of teaching ICT.
12. Activation of educational and cognitive activities of students by means of ICT



**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  |
|---|--|-------------------|--------------------|
| 1. GENERAL TRAINING CYCLE                                     |  |                   |                    |
| Compulsory components of EPP                                  |  |                   |                    |
| CC 1  | Business foreign language  | 6                 | exam               |
| CC 2  | Head of educational institution  | 4                 | offset, exam       |
| Optional components of EPP                                    |  |                   |                    |
| Optional subjects by Student's Choice                         |  |                   |                    |
| OB 1  | Optional discipline 1  | 4                 | exam               |
| OB 2  | Optional discipline 2  | 4                 | exam               |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE                      |  |                   |                    |
| Compulsory components of EPP                                  |  |                   |                    |
| 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  | 7                 | course robot, exam |
| CC 5  | Modern programming technologies  | 6                 | exam               |
| CC 6  | Pedagogy of higher education   | 9                 | exam               |
| CC 7  | Leadership in education and IT   | 4                 | exam               |
| CC 8  | Scientific and Industrial Practice   | 4                 |                    |
| CC 9  | Production (assistant) practice  | 5                 |                    |
| CC 10   | Production (undergraduate) practice  | 9                 |                    |
| CC 11   | Master's defense   | 10                |                    |
| Optional components of EPP                                    |  |                   |                    |
| Optional Block by choice of specialty                         |  |                   |                    |
| Optional Block 1 "Psychological and pedagogical"              |  |                   |                    |
| OB 2.1  | 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 "Educational, information and communication" |  |                   |                    |
| OB 2.2.   | Educational-dimension.   | 4                 | exam               |
|   | Smart digital technology   |                   |                    |
|   | Design and examination of the information and educational environment  |                   |                    |
| Optional Block 3 "Informative"                                |  |                   |                    |
| OB 2.3  | Web programming  | 4                 | exam               |
|   | The creation of the e-resources  |                   |                    |
|   | Technology STEM education  |                   |                    |
|   | Mobile Learning Technologies   |                   |                    |
| Optional Block 4 "Philosophical and Economicll"               |  |                   |                    |
| OB 2.4.   | Organization of project activities   | 4                 | exam               |
|   | Entrepreneurship The essence of entrepreneurship   |                   |                    |
|   | World economy  |                   |                    |
|   | Philosophy of Education  |                   |                    |
| The total amount of optional components                       |  | 66                |                    |
| The total amount of compulsory components                     |  | 24                |                    |
| THE TOTAL AMOUNT OF EPP                                       |  | 90                |                    |

## Annotations of subjects in the curriculum

### 1. 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.

### 2. 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 and IT.** The essence of the concept "liberallove"; the basics of development and formation of leadership qualities of personality; the evolution of ideas selection of leadership, the basic principles of modeling of the structure of leadership qualities of the future specialist; foundations self-leadership: the nature, techniques, stages, reflection; forms of realization of leadership potential; examples of leadership in national and world history.

#### Optional components of EPP

*Optional Block by choice of specialty*

*Optional Block 1 "Psychological and pedagogical"*

**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

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classroom educational activities with students.

**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 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 Success of the event. A comparison of the concepts of "success" and "success". The concept of life and social success. The problem of the formation of orientation on achievement of success in life in today's youth.

#### *Optional Block 2 "Educational, information and communication"*

**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.

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*Optional Block 3 "Informative"*

**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. 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 "Philosophical and Economic"*

**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

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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 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 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.

**Training of masters of sciences  
in branch of knowledge "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                                      | 15   |
| – Part-time                                      | 5  |
| Duration of training                             |  |
| – Full-time educational and professional program | 1,5 year   |
| – Part-time                                      | 1,5 year   |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of teaching                             | Ukrainian, German, English   |
| Qualification of graduates                       | Master in Philology,<br>philologistresearcher, translator<br>(English /German), teacher of higher<br>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 agrobiolgy, 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**

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 for Master Theses

1. Stylistic and cognitive-pragmatic problems of translation of English agrarian advertising texts.
2. Reproduction of the linguistic and cultural features of English 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. English terminological borrowings and their translation into Ukrainian.

### 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>1. 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>Optional subjects by Student's Choice</i>     |  |                   |                   |
| OB 1   | Optional discipline 1  | 4                 | test              |
| OB 2   | Optional discipline 2  | 4                 | test              |
| <b>2. 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              |
| <b>Optional components EPP</b>                   |  |                   |                   |
| <i>Optional Block by choice of specialty</i>     |  |                   |                   |
| <i>Optional Block 1</i>                          |  |                   |                   |
| OB 1.1   | Head of the Educational Institution  | 4                 | exam              |
| OB 1.2   | Information Technologies in Translation  | 4                 | exam              |
| OB 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>                          |  |                   |                   |
| OB 2.1   | Comparative Typology of the First Foreign and Ukrainian Languages  | 4                 | exam              |
| OB 2.2   | Modern computer translators' tools   | 4                 | exam              |
| OB 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>50</b>         |                   |
| <b>The total amount of Optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 9   | State exams  | 2                 |                   |
| CC 10  | Master's thesis preparation and defence  | 6                 |                   |
| CC 11  | Practical training   | 8                 |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

## Annotations of Components in the Curriculum

### 1. 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

### 2. 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 English 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***Optional Block by choice of 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 English texts on horticulture and forestry, ecology and agronomy, veterinary medicine and animal science. Consecutive interpretation of Ukrainian texts into English, interpreting excerpts into Ukrainian. Oral and written summarization in Ukrainian and English.

*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.

**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                                      | 5   |
| Duration of training                             |   |
| – Full-time educational and professional program | 1,5 year  |
| – Part-time                                      | 1,5 year  |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of teaching                             | Ukrainian, German, English  |
| Qualification of graduates                       | Master in Philology,<br>philologistresearcher, translator<br>(German/English), teacher of higher<br>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 agrobiolgy, 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**

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 for Master Theses

1. Stylistic and cognitive-pragmatic problems of translation of German agrarian 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>1. 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>Optional subjects by Student's Choice</i>     |  |                   |                   |
| OB 1   | Optional discipline 1  | 4                 | test              |
| OB 2   | Optional discipline 2  | 4                 | test              |
| <b>2. 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              |
| <b>Optional components EPP</b>                   |  |                   |                   |
| <i>Optional Block by choice of specialty</i>     |  |                   |                   |
| <i>Optional block 1</i>                          |  |                   |                   |
| OB 1.1   | Head of the Educational Institution  | 4                 | exam              |
| OB 1.2   | Information Technologies in Translation  | 4                 | exam              |
| OB 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>                          |  |                   |                   |
| OB 2.1   | Comparative Typology of the First Foreign and Ukrainian Languages  | 4                 | exam              |
| OB 2.2   | Modern computer translators' tools   | 4                 | exam              |
| OB 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>50</b>         |                   |
| <b>The total amount of Optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 9   | State exams  | 2                 |                   |
| CC 10  | Master's thesis preparation and defence  | 6                 |                   |
| CC 11  | Practical training   | 8                 |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

## Annotations of Components in the Curriculum

### 1. 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

### 2. 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

#### *Optional Block by choice of 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.

**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                                      | 50                            |
| – Part-time                                      | 50                            |
| Duration of training                             |                               |
| – Full-time educational and professional program | 1,5 year                      |
| – Part-time                                      | 1,5 year                      |
| Credits ECTS:                                    |                               |
| – educational and professional program           | 90                            |
| Language of teaching                             | Ukrainian                     |
| Qualification of graduates                       | Master's degree in Psychology |

**Concept of training**

The training of a psychologist is determined by the demand of our State for specialists providing psychological assistance to an individual and a group. The professional activity of a specialist of this type involves diagnostics, examination and correction of psychological properties and states, mental processes, various types of human activities in norm and pathology taking into account the features of age stages, developmental crises, risk factors, belonging to gender, ethnic, professional and other social groups.

**Employment of Graduates**

A graduate can work in educational institutions of all levels and types, enterprises and organizations, health care institutions, centers of practical psychology, social services, consulting centers, research institutions, penitentiary and law institutions for the provision of expert services at the job-place (according to the classification of professions in Ukraine): 2445.2 - psychologist, 2445.2 - practical psychologist, 1232 - chief psychologist, 2412.2 - professional on personnel development, 5131 - tutor.

**Practical training**

Practical training is carried out in accordance with the curriculum schedule, on the basis of certified practice bases, including: centers of practical psychology, counseling centers, social services, law institutions, health and care institutions.

**Proposed Topics for Master Theses**

1. Communicative competence as a prerequisite for adaptive personality behavior.
2. Modern approaches to the correction and therapy of neurotic disorders.
3. Coaching technologies as a means of preventing professional burnout crises.
4. Psychological patterns establishing the professional identity of the psychologist.
5. Psychological features of dating in social networks.

**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>1. GENERAL TRAINING CYCLE</b>                                 |  |                   |                   |
| <b>Compulsory components EPP</b>                                 |  |                   |                   |
| CC 1   | Business Foreign Language  | 6                 | credit, exam      |
| CC 2   | Psychology of higher education   | 4                 | exam              |
| CC 3   | Methodological problems of psychology  | 4                 | exam              |
| <b>Optional components of EPP</b>                                |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>                     |  |                   |                   |
| OB 1   | Optional discipline 1  | 4                 | credit            |
| OB 2   | Optional discipline 2  | 4                 | credit            |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                  |  |                   |                   |
| <b>Compulsory components EPP</b>                                 |  |                   |                   |
| CC 4   | Differential Psychology  | 6                 | exam              |
| CC 5   | Ethnopsychology  | 6                 | exam              |
| CC 6   | Psychological assistance to the individual   | 6                 | exam              |
| CC 7   | Stress Psychology (with course work)   | 6                 | exam              |
| CC 8   | Workshop on psychological counseling   | 6                 | exam              |
| CC 9   | Organizational psychology  | 6                 | exam              |
| CC 10  | Modern directions of psychotherapy (with course work)  | 6                 | exam              |
| <b>Optional components EPP</b>                                   |  |                   |                   |
| <i>Optional Block by choice of specialty</i>                     |  |                   |                   |
| <i>Optional block 1 "Psychology in Organizations"</i>            |  |                   |                   |
| OB 1.1   | Psychological bases of coaching  | 4                 | exam              |
| OB 1.2   | Leadership Psychology  | 4                 | exam              |
| OB 1.3   | Psychology of business communication   | 4                 | exam              |
| OB 1.4   | Creativity training  | 4                 | exam              |
| <i>Optional block 2 "Psychological Psychological Assistance"</i> |  |                   |                   |
| OB 2.1   | Projective diagnostic techniques   | 4                 | exam              |
| OB 2.2   | Child psychotherapy  | 4                 | exam              |
| OB 2.3   | Psychiatric Propedeutics   | 4                 | exam              |
| OB 2.4   | Telephone counseling   | 4                 | exam              |
| <b>The total amount of Compulsory components</b>                 |  | <b>56</b>         |                   |
| <b>The total amount of Optional components</b>                   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                                |  |                   |                   |
| CC 11  | Educational psychological practice   | 2                 | test              |
| CC 12  | Industrial psychological practice  | 6                 | test              |
| CC 13  | Certification exam   | 1                 |                   |
| CC 14  | Protection of qualification work   | 1                 |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                                   |  | <b>90</b>         |                   |

**Curriculum component annotations**

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

**Business Foreign Language.** Phonetic norms of a foreign language. Listening and Broadcasting. The lexical minimum (the categories of being, their properties and relationships; geographical, demographic, economic and political data) of the particular country of the language being studied. The lexical minimum of regional and social differences between Ukraine and the country whose language they are learning. Exploratory and searchable reading at a fixed speed without a dictionary Learning reading

with a certain number of unknown words (using a dictionary). Abbreviations of foreign language professional terms in a specific vocational field. Structure of the dialogue of general scientific character. Features of a professionally oriented dialogue. Lexical minimum of business contacts, business meetings, meetings. Elements of interpreting information in a foreign language in the process of business contacts, business meetings, meetings.

**Psychology of higher education.** The study of discipline involves acquaintance of future specialists with the higher education system in Ukraine, its tendencies, regularities, specifics of the process of formation of education and upbringing, peculiarities of the learning process, forms of organization of training, organization of independent and research work of students, functions of control, education and self-education in higher education.

**Methodological problems of psychology** The study of discipline involves understanding the concept of methodology of science. The place of methodology of psychology in the system of professional psychological knowledge. Functions and levels of methodology. Structure of methodological knowledge. Functions of methodology as a science. Methodological space of scientific psychology. Categorical system of psychology. The concept of the psychosphere. The concept of the scientific paradigm as a way of organizing scientific knowledge. Theoretical problems of psychology. Methodological principles of psychology. The problem of crisis in psychology. The concept of methodological crisis. Crisis phenomena in psychology (historical analysis). Prospects for the development of psychological science. Methods for overcoming methodological crises. Prospects for development of methodology of psychology. The post-classical paradigm in psychology as a picture of the world. Signs of Post-Classical Science in Contemporary Psychological Research. Subject-action paradigm in modern psychology. Key problems of psychology. Psychophysical problem. Psychophysiological problem. The problem of psycho-diagnostics.

## 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

### Compulsory components of EPP

**Differential psychology.** The study of discipline involves defining the subject and tasks of differential psychology. Investigation of individual differences in early psychological theories. Prerequisites for the emergence of differential psychology: experimental psychology and biology. Basic differential-psychological constructs. Differential-psychological paradigm in the study of man. The concept of talent, talent and genius. Addiction to a certain activity. Relation of inclinations with abilities and giftedness. Differential-psychophysiological aspects of becoming a professional. Monotonous activity and typological features. Activity in extreme conditions. Professional styles. Intellectual competence in higher education. Choice of profession and personality type. Subjective attitudes, productivity, and job satisfaction. Sexual features of professional activity. Sexual features of a professional career.

**Ethnopsychology.** The study of discipline involves the formation and interdisciplinary connections of ethnic psychology. The structure of ethnopsychology. Categorical apparatus of ethnopsychology. Theoretical approaches to the study of ethnopsychological features. Research methods in ethnopsychology. Basic approaches to defining the concept of "ethnos". The concept of "ethnogenesis" in ethnopsychology. General characteristics of ethnic processes. The influence of culture on the formation of ethnic groups. The concept of ethnic consciousness and consciousness. The concept of ethnic identity. Stages of ethnic identity formation. The influence of the social environment on the formation of ethnic identity. General characteristics of interpersonal and intergroup relationships. The concept of ethnic stereotypes. Causes and ways to overcome prejudice.

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Psychological determinants of interethnic relations. General characteristics and classification of interethnic conflicts. Causes and ways of settling interethnic conflicts.

**Psychological assistance to the individual.** Methodological and theoretical principles of counseling and psychotherapy; general principles of counseling and psychotherapy; the main stages and procedure of the counseling and psychotherapy process; main directions of providing psychotherapeutic help; peculiarities of psychodiagnosis of personal problems; specificity of individual psychotherapy. plan and organize counseling and psychotherapy process, formulate therapeutic tasks; to perform psychodiagnosis and interpret the client's psychological problems; apply methods and techniques in the process of counseling and psychotherapeutic work with the client.

**Psychology of stress.** The study of discipline involves the analysis of theoretical approaches in the psychology of stressful situations. Mastering the skills of psychodiagnosis of traumatic conditions, mastering the knowledge of psychological peculiarities of stress, trauma and formation of skills to use methodical methods of studying traumatic experiences, preparation for the choice of strategy of psychological help and support.

**Workshop on psychological counseling.** Organization of consultative interaction. Concept of advisory contact. Technology interviewing interviews and conversations. Basic procedures of psychological counseling. Family and marriage counseling. Psychological counseling in education. Provision of advisory assistance. Group counseling.

**Organizational psychology.** Subject and main tasks of psychology of organizations and business. History and current state of development of organizational psychology. Areas of work of modern organizational psychologists. Trends in the development of organizational psychology in Ukraine. Personality in the system of organizational interaction. Psychological analysis of structural and functional features of organizations. Psychological essence of social organization. The concept of organization. The organizational structure. Formal organizational structure. Informal organizational structure. The concept of organizational culture. The structure of organizational culture. Problems of diagnostics of organizational culture. Content and formation of organizational culture. Methods of supporting organizational culture. Problems that arise in the relationship between organizations and individuals. Absenteeism. Technology to prevent and overcome communication barriers in the organization. Technology for the prevention and resolution of organizational conflicts. The place and role of the psychologist in the organization. "External" and "internal" positions of the psychologist in the organization. Set of frames. Motivation of organizational activity. Communicative structure of the organization.

**Modern directions of psychotherapy.** Psychotherapy at the present stage, the place of psychotherapy in the system of psychological knowledge. Basic directions, types and forms of psychotherapeutic work of the psychologist. Purpose, tasks and principles of psychotherapy. Psychotherapist training, competency and qualification issues. Model of the relationship between psychologist and client within different psychotherapy schools. Requirements for the personality of a psychotherapist within different therapeutic areas and schools. Professional deformation of the psychologist's personality. Professional ethics and responsibility of psychotherapist. Clinical and physiological bases of psychotherapy. Psychological principles of psychotherapy. Medical model of psychotherapy, interaction in the system "doctor-patient". Psychological model of psychotherapy, interaction in the system "psychologist-client". The main stages of the psychotherapeutic process.

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### **Optional components of EPP**

*Optional Block by choice of specialty*

#### *Optional Block 1 "Psychology in Organizations"*

**Psychological bases of coaching.** The study of the discipline provides coverage of the essence of coaching and the characteristics of the coaching process. Illumination of the basic psychological conditions and factors of formation of managerial competence by means of coaching technologies. Presentation of the characteristic of the basic technologies and coaching tools in terms of their practical application in work with the client according to the standards of the International Coaching Federation (ICF).

**Leadership Psychology.** In the course of studying the discipline, students form an idea of the subject and tasks of leadership psychology at the present stage, its main directions, opportunities for practical application. Definition of how psychology today is about leadership and related concepts. Consider the history of learning about leadership as a story of ideas that either remain productive to this day or have disappeared as unpromising. The course outlines specific facts, theories, research findings. The phenomenon of leadership in the whole complex of problems related to the government, organization, person is considered.

**Psychology of business communication.** Historical and psychological aspects and characteristics of business communication. Definition of business communication, its classification. Psychological features of business communication. Communication areas. Phases of communication. Forms and functions of communication. Communication strategy and tactics. Levels of business communication. Characteristics of the business psychological climate. Patterns of psychological relations and behavior of people in the process of business communication. Features of behavior with interlocutors of different psychological types. Psychology of non-verbal behavior.

**Creativity training.** The study of discipline involves the formation of future psychologists knowledge system on the characteristics of the creative process, the formation of creative personality, psychological approaches to work with a creatively gifted personality. Creativity as a form of social consciousness and spiritual culture of mankind. Features and types of creative activity. Features of the creative process. Stages of the creative process. Development of creative abilities in different ages. Psychological features of creative personality. Methods of diagnostics of creativity and creativity. The concept of creative activity in psychology. The role of observation in the formation of creative personality. The role of advanced imagination in the development of the creative personality, the role of memory and fantasy as components of creative activity.

#### *Optional Block 1 "Psychological Psychological Assistance"*

**Projective diagnostic techniques.** The study of discipline involves learning about the features of psychodiagnosis of unconscious aspects of the subject's psyche; developing competence in the use of graphic and projective materials in the study of personal problems; acquaintance with the method of psychoanalytic analysis of personal problems using a complex of thematic drawings. Classification of projective techniques. Groups of projective methods: designing, structuring, additive, interpreting, expressive, impressive, catharsis. Features of drawing techniques. Analysis of children's drawings. The method of portrait elections is an adapted test by L. Sondi. Thematic apertive test (TAT). The technique of ink stains by G. Rorschach.

**Child psychotherapy.** The study of discipline involves the coverage of scientific research in the field of psychological and psychosomatic problems, descriptions of experience of practical work in various spheres of professional activity, theoretical foundations on which child psychotherapy is based. Students get a glimpse into the little-known layers of relationships between children and society that lead to various problems

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in the child's psyche and which we face in everyday life, such as the reflection of social transformations in the dynamics of adolescent psychotherapy groups, folk mythology and myths, mother-child communication in the prenatal period, image of a man in the context of maternal identification of a woman, crisis teenage "migration" from childhood, as well as "war" with the mind.

**Psychiatric Propedeutics.** The study of discipline involves the formation of an idea of psychiatry, and its connection with psychology and psychotherapy. Definitions are given: concepts of symptom, syndrome and nosology in psychiatry. Acquaintance with disorders of mental functions: disorders of consciousness, memory and attention, thinking, will, perception, emotions, behavior. Psychotic disorders: schizophrenia, schizoaffective and bipolar psychoses, epilepsy, senile and presenile psychoses, reactive psychoses, intoxication psychoses. Borderline Disorders: Addiction, Psychopathy, Anorexia \ Bulimia. Psychosomatic disorders: self-destructive behavior. Anxiety disorders: neuroses.

**Telephone counseling.** The study of the discipline involves determining the organization of consultative telephone interaction. Concept of advisory telephone contact. The technology of telephone consultative interviews and conversations. Basic telephone counseling procedures. Phone counseling on family and marriage issues. Provision of emergency telephone psychological support to persons at risk.

**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
specialty 073 "MANAGEMENT"  
educational program "MANAGEMENT OF EDUCATIONAL INSTITUTION"**

|  |  |
|--|--|
| Form of Training:                                | Licensed number of persons:  |
| – Full-time                                      | 25   |
| – Part-time                                      | 25   |
| Duration of training                             |  |
| – Full-time educational and professional program | 1,5 year   |
| – Part-time                                      | 1,5 year   |
| Credits ECTS:                                    |  |
| – educational and professional program           | 90   |
| Language of teaching                             | Ukrainian  |
| Qualification of graduates                       | Head of the enterprise, institution<br>and organization (in the field of<br>education and production training) |

**The concept of training**

The training of the head of the enterprise of the institution and organization (in the field of education and production training) is conditioned by the need of our state in specialists who are involved in the design and optimization of the organizational structure of the educational institution; leadership of its educational and economical activities; control over the execution of the planned tasks; the formation of personnell policy of the educational institution and the contingent of persons who study there.

**Educational and professional training programs**

***Optional block "Management activity in institutions of general secondary education"***

Studying of the complex of educational disciplines on planning and organization issues of the activities of the institution of general secondary education, management of educational and economic activities of the institution of general secondary education, control over the implementation of the planned tasks, the formation of personnell policy of the institution of general secondary education and contingent of persons who study there is provided for the future specialists. 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 employment of graduates**

Graduated students with the qualification of the "Head of the enterprise, institution and organization (in the field of education and production training)" can work in institutions of general secondary education having the following positions: school principal, head of training center, head mistress of extrascholastic institution.

***Optional block "Management activity in the institutions of vocational education"***

Studying of the complex of educational disciplines on planning and organization issues of the activities of the institution of general secondary education, management of educational and economic activities of the institution of general secondary education,

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control over the implementation of the planned tasks, the formation of personnel policy of the institution of general secondary education and contingent of persons who study there is provided for the future specialists. 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 employment of graduates**

Graduated students with the qualification of the "Head of the enterprise, institution and organization (in the field of education and production training)" can work in vocational education institutions having the following positions: director (head) of a vocational education institution; director (of educational and production complex, training center, training (training center), training center, branch); head (of college; courses for advanced training; training center); head of the training point; head mistress of department, point, sector.

#### ***Optional block "Management activity in higher education institutions"***

Studying of the complex of educational disciplines on planning and organization issues of the activities of the institution of general secondary education, management of educational and economic activities of the institution of general secondary education, control over the implementation of the planned tasks, the formation of personnel policy of the institution of general secondary education and contingent of persons who study there is provided for the future specialists. 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 employment of graduates**

Graduated students with the qualification of the "Head of the enterprise, institution and organization (in the field of education and production training)" can work in institutions of higher education having the following positions: director (head) of institution of higher education; director (of courses of advanced training, training raining center); training point, branch); head (of department, point, sector, educational and scientific base, training room, courses, laboratories (education), educational point); head of student's design and development (research) bureau.

#### **Practical training**

Practical training is carried out in accordance with the curriculum schedule directly on the basis of practitioners' passports of practice, among which: institutions of general secondary education, institutions of vocational education; institutions of higher education (colleges, institutes, academies, universities).

#### **Approximate topics of master's theses**

1. Management of the institution of vocational education with the usage of innovative technologies.
2. Strategy designing for the development of the institution of vocational education.
3. Content and features of management of the institution of general secondary education.
4. Formation of the corporate culture of the personnel of vocational education institutions.

5. Formation of managerial culture of the head of the institution of general secondary education.
6. Information provision of educational process management in higher education institutions.
7. Management of the secondary school in the conditions of introduction of profile training.
8. System approach to the management of innovation activities of research type universities.
9. Formation of motivation and stimulation of the personnel of institutions of secondary education.
10. System of effective personnel management in institutions of general secondary education.

**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 |
|---|--|-------------------|-------------------|
| 1. GENERAL TRAINING CYCLE   |  |                   |                   |
| Compulsory components EPP   |  |                   |                   |
| CC 1  | Psychology of management   | 4                 | Exam              |
| CC 2  | Management of educational activity   | 4                 | Exam              |
| CC 3  | Information technologies in education and management of educational institutions                                     | 4                 | Exam              |
| CC 4  | Business Foreign Language  | 4                 | Exam              |
| CC 5  | Methodology and organization of research with the basics of intellectual property                                    | 4                 | Exam              |
| CC 6  | Strategic management   | 4                 | Exam              |
| Optional components of EPP  |  |                   |                   |
| Optional subjects by Student's Choice   |  |                   |                   |
| OB 1  | Optional discipline 1  | 4                 | Exam              |
| OB 2  | Optional discipline 2  | 4                 | Exam              |
| 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE  |  |                   |                   |
| Compulsory components EPP   |  |                   |                   |
| CC 7  | Management of financial and economic activity  | 6                 | Exam              |
| CC 8  | Personnell management  | 6                 | Exam              |
| CC 9  | Manager of educational institution   | 5                 | Exam              |
| CC 10   | Management and administration  | 4                 | Exam              |
| Optional components EPP   |  |                   |                   |
| Optional Block by choice of specialty   |  |                   |                   |
| Optional block 1 "Management activity of institutions of general secondary education" |  |                   |                   |
| OB 1.1.   | Pedagogy and educational technologies  | 8                 | Exam              |
| OB 1.2.   | Management of the educational process  |                   |                   |
| OB 1.3.   | Management of educational institution development  |                   |                   |
| OB 1.4.   | Technology of management activity  | 4                 | Exam              |
| OB 1.5.   | Monitoring educational Quality   |                   |                   |
| OB 1.6.   | Administrative management  |                   |                   |
| OB 1.7.   | Organization of the activities of the general secondary educational establishments                                   | 4                 | Exam              |
| OB 1.8.   | Quality management of the educational process  |                   |                   |
| OB 1.9.   | System development of educational institution  |                   |                   |
| Optional block 2 "Management activity in the institutions of vocational education"    |  |                   |                   |
| OB 2.1.   | Pedagogy and educational technologies  | 8                 | Exam              |
| OB 2.2.   | Management of educational process  |                   |                   |

| Code n/a  | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control   |
|---|--|-------------------|---------------------|
| OB 2.3.   | Management of educational institution development  | 4                 | Exam                |
| OB 2.4.   | Technology of management activities  |                   |                     |
| OB 2.5.   | Monitoring educational Quality   |                   |                     |
| OB 2.6.   | Administrative management  |                   |                     |
| OB 2.7.   | Conflictology  | 4                 | Exam                |
| OB 2.8.   | Fundraising in educational institutions  |                   |                     |
| OB 2.9.   | Management of the development of the educational system of educational institutions                                  |                   |                     |
| <i>Selective block 3 "Management activity in higher education institutions"</i> |  |                   |                     |
| OB 3.1.   | Pedagogy and educational technologies  | 8                 | Exam                |
| OB 3.2.   | Management of the educational process  |                   |                     |
| OB 3.3.   | Management of educational institution development  |                   |                     |
| OB 3.4.   | Technology of management activities  | 4                 | Exam                |
| OB 3.5.   | Monitoring educational Quality   |                   |                     |
| OB 3.6.   | Administrative management  |                   |                     |
| OB 3.7.   | Modern software products and Internet technologies in education  | 4                 | Exam                |
| OB 3.8.   | Management of educational activities   |                   |                     |
| OB 3.9.   | Modeling specialist activity   |                   |                     |
| <b>The total amount of compulsory components</b>                                |  | <b>45</b>         |                     |
| <b>The total amount of selective components</b>                                 |  | <b>24</b>         |                     |
| <b>3. OTHER TYPES OF TRAINING</b>   |  |                   |                     |
| CC 11   | Internship (managerial) practice   | 5                 | Differential Credit |
| CC 12   | Internship (pre-diploma) practice  |                   | Credit              |
| CC 13   | Personnell management  | 1                 | Credit              |
| CC 14   | Management and administration  | 1                 | Credit              |
| CC 15   | Preparation and defense of master's thesis research  | 14                | Thesis defense      |
| <b>THE TOTAL AMOUNT OF EPP</b>  |  | <b>90</b>         |                     |

### Annotations of disciplines of the education plan

#### 1. 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 planning of educational activity at the institution of education. Organization and content of educational activity. Strategic (perspective) and tactical (current) planning and their implementation in the planning documents of the educational institution. Planning and organization of educational process at the educational institution. Diagnostics and reports on the educational activity of the educational institution.

**Information technologies in education and management of educational institutions.** Methodology of using the Internet in educational institutions. Method of using the capabilities of MS OFFICE. Methodology of using cloud-oriented services and technologies. Method of using the PPP.

**Business Foreign Language.** Formation of knowledge and skills in reading professional and scientific literature, conducting conversations in the mode of "supervisor-subordinate", "subordinate-supervisor", annotation and abstracting of texts.

**Methodology and organization of research with the basics of intellectual property.** Characteristics of the main normative-legal documents on intellectual property, theoretical and practical problems of legal organization of scientific researches.

**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.

## 2. 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 educational institutions. Estimates of the activity of educational institution. Mechanisms and technologies for making managerial decisions on issues of financial and economic activities of educational 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 educational institution.** Professional activity of specialist. Modeling of the professional activity of specialist. Content of specialist's education. Standards of Education. Social activity of 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.

**Management and administration.** The concept and idea of management. Organization as an object of management. Management functions: planning and organization, motivation and control. Principles and methods of management. Organizational structures. The order of their construction. The process of the adoption and implementation of management decisions. Models and methods of making managerial decisions. Communication in management. Conflict and stress management. Conflicts in the organization. Changes and stresses. Management and leadership. Business ethics. Management of the labor collective. Management of labor resources. Self-management. World experience of personnel management.

### Optional components of EPP

*Optional Block by choice of specialty*

*Optional Block 1 "Management activity of institutions of general secondary education"*

**Pedagogy and 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 educational 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

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movement of students. Organization of educational process in higher educational institutions ; basic principles of organization of the educational process in ZVO; forms of organization of educational process in ZVO; forms of training in the ZVO; control measures in the process of professional training.

**Management of educational institution development.** Concepts and modern concepts of management of development of educational institution. Basic features of systemic development management. Analysis of internal and external factors of development of educational institution. Targeted program is the main means of systemic development management. Systematic planning of educational institution development. System development management of educational institution. Effective use of all types of educational institution resources. Making optimal decisions regarding the development of the educational 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.

**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 educational institution, strategy of development of the educational institution.

**Organization of the activities of the general secondary educational establishments.** Scientific foundations of general secondary education institution management, educational 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 educational 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.

*Optional Block 2 "Management activity in the institutions of vocational education"*

**Pedagogy and 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 educational 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 institution; basic principles of organization of the educational process in higher education institution; forms of organization of educational process in higher education institution; forms of

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training in the higher education institution; control measures in the process of professional training.

**Management of educational institution development.** Concepts and modern concepts of management of development of educational institution. Basic features of systemic development management. Analysis of internal and external factors of development of educational institution. Targeted program is the main means of systemic development management. Systematic planning of educational institution development. System development management of educational institution. Effective use of all types of educational institution resources. Making optimal decisions regarding the development of the educational 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.

**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 educational institution, strategy of development of the educational institution.

**Conflictology.** Formation of tolerant attitude towards people, strategies of interaction in conflict situations, basics of conflict prevention, methods of conflict resolution.

**Fundraising in educational institutions.** The essence, principles and basic concepts of fundraising. Experience and prospects for its development. Fundraising activities and forms of its support. Foundations and grants. Fundraising activities planning.

**Management of the development of the educational system of the education institution.** Pedagogical laws and means of organizing and implementing the educational process (self-education, training, education, self-education), development (self-development) and professional preparation of students for a certain type of activity and social life.

*Optional Block 3 "Management activity in higher education institutions"*

**Pedagogy and 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 educational 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 institution; basic principles of organization of the educational process in higher education institution; forms of organization of educational process in higher education institution; forms of training in the higher education institution; control measures in the process of professional training.

**Management of educational institution development.** Concepts and modern concepts of management of development of educational institution. Basic features of systemic development management. Analysis of internal and external factors of

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development of educational institution. Targeted program is the main means of systemic development management. Systematic planning of educational institution development. System development management of educational institution. Effective use of all types of educational institution resources. Making optimal decisions regarding the development of the educational 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.

**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 educational institution, strategy of development of the educational institution.

**Modern software products and Internet technologies in education.** The place and role of modern software products and Internet technologies in education, the organizational principles of the usage of modern software products and Internet technologies in education.

**Management of educational organization.** Features of the educational institution as a social-pedagogical system and its management. Management theory of educational organization. General management functions. Improvement, rationalization, quality, efficiency of management of educational institution.

**Modeling specialist activity.** General concept of the phenomenon of activity. Analysis of the specialist's social activity. Analysis of the professional activity of a specialist. General scheme of construction of a specialist and his professional activity.

**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
speciality 073 "MANAGEMENT"  
educational program "HUMAN RESOURCES MANAGEMENT"**

|  |                             |
|--|-----------------------------|
| Form of Training:                                | Licensed number of persons: |
| – Full-time                                      | 25                          |
| – Part-time                                      | 25                          |
| Duration of training                             |                             |
| – Full-time educational and professional program | 1,5 year                    |
| – Part-time                                      | 1,5 year                    |
| Credits ECTS:                                    |                             |
| – educational and professional program           | 90                          |
| Language of teaching                             | Ukrainian                   |
| Qualification of graduates                       | 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 bussiness meetings and conference service.

**Educational and professional training program**

***Optional block "Personnel Management in Enterprises and Organizations"***

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 "Spetstekhnoeksport".

**Approximate topics of master's theses**

1. Professional selection and improvement of personnel.
2. Foreign experience of applying methods of work with staff.
3. Analysis and ways to improve serving workplaces of workers.
4. Analysis and ways of improving work conditions at production.
5. Analysis and ways of improving the usage of work time at the organization.
6. Organization of staff assessment and its effectiveness.
7. Organization of staff development and its effectiveness.
8. Competitiveness of the personnel of the organization and ways of its improvement.
9. Improvement of staff's socio-psychological climate.
10. Audit of social problems in the organization.

**Master's Training Curriculum  
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>1. GENERAL TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components EPP</b>  |  |                   |                   |
| CC 1  | Psychology management  | 4                 | Exam              |
| CC 2  | Fundamentals of human resources management   | 4                 | Exam              |
| CC 3  | Information systems and technologies in management of the organization   | 4                 | Exam              |
| CC 4  | Business Foreign Language  | 4                 | Exam              |
| CC 5  | Legislative base of labour relations   | 4                 | Exam              |
| CC 6  | Project management   |                   |                   |
| <b>Optional components of EPP</b>   |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>                                    |  |                   |                   |
| OB 1  | Optional discipline 1  | 4                 | Exam              |
| OB 2  | Optional discipline 2  | 4                 | Exam              |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>                                 |  |                   |                   |
| <b>Compulsory components EPP</b>  |  |                   |                   |
| CC 7  | Business Planning  | 6                 | Exam              |
| CC 8  | Personnel audit  | 5                 | Exam              |
| CC 9  | Management of personnel development  | 6                 | Exam              |
| CC 10   | Team management  | 4                 | Exam              |
| <b>Optional components EPP</b>  |  |                   |                   |
| <i>Optional Block by choice of specialty</i>                                    |  |                   |                   |
| <i>Optional block 1 "Personnel management in enterprises and organizations"</i> |  |                   |                   |
| OB 1.1.   | Self-management  | 4                 | Exam              |
| OB 1.2.   | Time-management  |                   |                   |
| OB 1.3.   | Organization of work of the manager  |                   |                   |
| OB 1.4.   | Modern technology of personnel management  | 4                 | Exam              |
| OB 1.5.   | Image study  |                   |                   |
| OB 1.6.   | Social partnership   |                   |                   |
| OB 1.7.   | Social management  | 4                 | Exam              |
| OB 1.8.   | Emotion management   |                   |                   |
| OB 1.9.   | Business ethics and corporate social responsibility  |                   |                   |
| OB 1.10.  | Management of the organization   | 4                 | Exam              |
| OB 1.11.  | Management of the strategic development of the organization  |                   |                   |
| OB 1.12.  | Changes management   |                   |                   |
| <b>The total amount of compulsory components</b>                                |  | <b>45</b>         |                   |

| Code n/a  | Components of the educational program (education disciplines, course projects (paper), practice, qualification work) | Amount of credits | The final control   |
|---|--|-------------------|---------------------|
| <b>The total amount of selective components</b> |  | <b>24</b>         |                     |
| <b>3. OTHER TYPES OF TRAINING</b>               |  |                   |                     |
| CC 11   | Educational practice   | 2                 | Credit              |
| CC 12   | Internship   | 3                 | Differential credit |
| CC 13   | Preparation and defense of master's thesis research  | 14                | Thesis defense      |
| CC 14   | Amount of coursework   | 2                 |                     |
| <b>THE TOTAL AMOUNT OF EPP</b>                  |  | <b>90</b>         |                     |

### Annotations of disciplines of the education plan

#### 1. GENERAL TRAINING CYCLE Compulsory components of EPP

**Psychology and conflictology.** 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.

**Project management.** Project management in the management system of an organization. Grounding of the practicability of the project and its effectiveness. Project Management Organizational Structures. Project planning as part of project management. Planning of timescales and terms of execution of a project. Project Resource Management. Project Staffing. Communications and information support management of the project. Control of timescales and terms of execution of a project. Risk Management in Projects. Project quality management.

## 2. 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

#### *Optional Block by choice of specialty*

#### *Optional Block 1 "Personnel management in enterprises and organizations"*

**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

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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 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.

**Social partnership.** 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.

**Management of the organization.** General theory of organization. Management of the organization. Personnel management. Motivation system. Techniques and methods of staff motivation in management practice. Project-oriented management of the organization.

**Management of the strategic development of the organization.** The concept of strategic management. Managing the strategic development of the organization.

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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 "Social work"  
specialty 231 "SOCIAL WORK"  
educational program "SOCIAL AND PSYCHOLOGICAL REHABILITATION"**

|  |   |
|--|---|
| Form of Training:                                | Licensed number of persons:   |
| – Full-time                                      | 25  |
| – Part-time                                      | 25  |
| Duration of training                             |   |
| – Full-time educational and professional program | 1,5 year  |
| – Part-time                                      | 1,5 year  |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of teaching                             | Ukrainian   |
| Qualification of graduates                       | 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.

**Spheres of graduates' employment**

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.

**Approximate topics of master's theses**

1. Socio-psychological rehabilitation of the participants of military conflicts.
2. Socio-psychological rehabilitation of the families of military personnel.

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.

**Master's Training Curriculum  
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>1. GENERAL TRAINING CYCLE</b>                 |  |                   |                   |
| <b>Compulsory components EPP</b>                 |  |                   |                   |
| CC 1   | Cross-cultural communication   | 4                 | E                 |
| CC 2   | Methodology and organization of scientific research  | 4                 | E                 |
| CC 3   | Head of the institution  | 4                 | E, C              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>     |  |                   |                   |
| OB 1   | Optional discipline 1  | 4                 | E                 |
| OB 2   | Optional discipline 2  | 4                 | E                 |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components EPP</b>                 |  |                   |                   |
| CC 4   | Social rehabilitation and «green» social work  | 5                 | E                 |
| CC 5   | Management of rehabilitation and social services institutions  | 8                 | E                 |
| CC 6   | Rehabilitation psychology  | 6                 | E                 |
| CC 7   | Inclusive pedagogy   | 7                 | E                 |
| <b>Optional components EPP</b>                   |  |                   |                   |
| <i>Optional Block by choice of specialty</i>     |  |                   |                   |
| OB 1.1.  | Social and psychological rehabilitation for families   | 4                 | E                 |
| OB 1.2.  | Basic course of physical and medical rehabilitation  | 4                 | E                 |
| OB 1.3.  | Digital marketing in social sphere   | 4                 | E                 |
| OB 1.4.  | Advertisement and information technologies in social sphere  | 4                 | E                 |
| OB 1.5.  | Premedical training  | 4                 | E                 |
| OB 1.6.  | Social project management  | 4                 | E                 |
| OB 1.7.  | Organization of rehabilitation in different social groups  | 4                 | E                 |
| OB 1.8.  | Social and psychological rehabilitation of emergency victims   | 4                 | E                 |
| <b>The total amount of compulsory components</b> |  | <b>38</b>         |                   |
| <b>The total amount of selective components</b>  |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 8   | Practical training   | 16                |                   |
| CC 9   | Preparation and defense of master's papers   | 12                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

## Annotations of disciplines of the education plan

### 1. GENERAL TRAINING CYCLE

#### Compulsory components of EPP

**Cross-cultural communication.** The educational component is aimed at the developing of students' tolerant attitude towards representatives of different cultures. This component is based on the overcoming of the barriers and developing business cooperation skills in a cross-cultural environment.

**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.

**Head of the institution.** Management of the institution. Responsibility of the supervisor for educational, financial, economic and other activities of the institution.

### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components of EPP

**Social rehabilitation and "green" social work.** 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

##### *Optional Block by choice of 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.

**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

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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.

**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.

**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 bulling; refugees and internally displaced person; war veterans and their families. Social protection of people affected by the Chernobyl disaster.

**Social and psychological rehabilitation of emergency victims.** Basic principles of providing psychological help to victims in psycho-traumatic situations. Overcoming consequences of psychological traumas: psychological first-aid. Psychological support in distress. Rules of nonviolent communication and conflict solution.

**Training of masters of sciences  
in branch of knowledge "Social work"  
specialty 231 "SOCIAL WORK  
educational program "SOCIAL WORK"**

|  |   |
|--|---|
| Form of Training:                                | Licensed number of persons:                                 |
| – Full-time                                      | 25  |
| – Part-time                                      | 25  |
| Duration of training                             |   |
| – Full-time educational and professional program | 1,5 year  |
| – Part-time                                      | 1,5 year  |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of teaching                             | Ukrainian   |
| Qualification of graduates                       | Manager in the social sphere,<br>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.

**Spheres of graduates' employment**

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.

**Topics for Master's 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.
  6. Social and pedagogical work in the sphere of children safeguarding.
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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.

**Master's Training Curriculum  
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>1. GENERAL TRAINING CYCLE</b>                 |  |                   |                   |
| <b>Compulsory components EPP</b>                 |  |                   |                   |
| CC 1   | Foreign language for business communication  | 4                 | E                 |
| CC 2   | Methodology and organization of scientific research  | 4                 | E                 |
| CC 3   | Head of the educational institution  | 4                 | E, C              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>     |  |                   |                   |
| OB 1   | Optional discipline 1  | 4                 | E                 |
| OB 2   | Optional discipline 2  | 4                 | E                 |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |  |                   |                   |
| <b>Compulsory components EPP</b>                 |  |                   |                   |
| CC 4   | Social work in Ukraine   | 5                 | E                 |
| CC 5   | Management of social systems   | 8                 | E                 |
| CC 6   | Family social support  | 6                 | E                 |
| CC 7   | Tertiary education   | 7                 | E                 |
| <b>Optional components EPP</b>                   |  |                   |                   |
| <i>Optional Block by choice of specialty</i>     |  |                   |                   |
| OB 1.1.  | Methods of teaching social pedagogy  | 4                 | E                 |
| OB 1.2.  | Art therapy in social pedagogical work   | 4                 | E                 |
| OB 1.3.  | Legal framework of social and pedagogical activity and basics of intellectual property right                         | 4                 | E                 |
| OB 1.4.  | Promotional and information technologies in social sphere  | 4                 | E                 |
| OB 1.5.  | Premedical training  | 4                 | E                 |
| OB 1.6.  | Psychological and pedagogical therapy  | 4                 | E                 |
| OB 1.7.  | Technologies for designing and evaluating social work  | 4                 | E                 |
| OB 1.8.  | Social policy  | 4                 | E                 |
| <b>The total amount of compulsory components</b> |  | <b>38</b>         |                   |
| <b>The total amount of selective components</b>  |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| OK 8   | Practical training   | 16                |                   |
| OK 9   | Preparation and defense of master's papers   | 12                |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

**Annotations of disciplines of the education plan**

**1. 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.

**Head of the educational institution.** Management of the educational institution. Responsibility for educational, financial, economic and other activities of the educational institution.

## 2. 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.

**Social supply of the family.** The discipline deals with the subject, the purpose and tasks of the discipline «Social support of the family»; the specifics of the work of social service centers for families, children and youth in support and social support for families; regulatory documents relating to the support of families of different types; existing technologies, forms and methods of social work for family support and social support for various categories of families, namely: foster families and foster children, family-type orphanages, divorced, dysfunctional families, young families and families where there is violence against family members, families with children with special needs.

**Tertiary education.** Basic problems of tertiary education: features of the educational process, basis of didactics, educational process technology, mentoring, development and socialization of the person, pedagogical patterns of the educational process.

### Optional components of EPP

#### *Optional Block by choice of specialty*

**Methods of teaching social pedagogy.** Analysis and development of the conceptual provisions of the teaching methodology as a science, its types and structure; methodological foundations, the nature and characteristics of the learning process in the university; principles, laws and conditions of planning and organization of the educational process in the university with social and pedagogical disciplines; methodological requirements to the forms of organization of the educational process from social and pedagogical disciplines in the university; methods of organizing and conducting the main types of educational and individual studies, independent work and practical training of students; conditions for the organization of control measures at the university with social and pedagogical disciplines; requirements for scientific and methodological support of social and pedagogical disciplines in the university.

**Art therapy in social pedagogical work.** The essence of art therapy. The main functions and methods of art therapy. Organization of art therapeutic process. The use of isotherapy methods in social pedagogical work. Art Therapy and Drawing: Ornate Characteristic. Symbolism of flowers, lines, shapes. Fairytale therapy in social and pedagogical work with children at risk. Psychological analysis of fairy tales. Compilation Algorithm. using the possibilities of music therapy in social work with clients and groups.

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Criteria for the selection of musical works. Sand therapy (sand-play) as a method of working with the case. The ratio of the game process and the result in sand therapy. Working with sand as a technology of psychocorrection.

**Legal framework of social and pedagogical activity and basics of intellectual property right.** Characteristics of the basic legal documents for social and pedagogical work, theoretical and practical issues of the legal framework of social and pedagogical activity.

**Promotional and information technologies in social sphere.** Specificity of using promotional and information technologies in social sphere, strategies and technologies of the interaction between social worker and the mass media, specificity of promotional activity of social workers and institutions.

**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.

**Psychological and pedagogical therapy.** Types of psychological assistance: psychodiagnostics, psychocorrection, psychological counseling and psychotherapy. The main directions of psychotherapy. The content of psychological and pedagogical assistance in educational institutions. Psychological and pedagogical counseling. Psychotherapeutic techniques in the work of a social worker.

**Technologies of social work design and evaluation.** The purpose of the course is to develop knowledge and skills of using modern project approach to solving social issues, focusing on the achievement of the final result with minimum time and money loss.

**Social policy.** Social policy as a public phenomenon. Goal and tasks of the social policy. Conditions of social policy implementation.

**EDUCATIONAL AND RESEARCH INSTITUTE  
OF CONTINUING EDUCATION AND TOURISM**

**Director** - PhD in Economics, Professor Mariia Kulaiets

Tel.: (044) 527-87-42, 527-86-53

E-mail: sec\_edu\_nni\_director@nubip.edu.ua

Location: Educational Building Number 10, room. 219

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

**Specialty 073 "Management"**

***Educational program "Management of Innovative Activity"***

Guarantor of the educational and professional program – Olga Vytvytska, Doctor of Economics, Professor.

Department in charge of graduate training:

**Department of Public administration and Management of Innovative Activity**

Tel.: (044) 527-86-58

E-mail: innovation\_chair@nubip.edu.ua

Head of department – Olha Vytvytska, Doctor of Economics, 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:

**Tourism, Hotel and Restaurant Business and Extension**

Tel.: (044) 527-80-61

E-mail: agroconsalt\_chair@nubip.edu.ua

Head of Department – Dariya Basyuk, Doctor of Economics, Professor.

**Speciality 281 "Public management and administration"**

***Educational program "Public management and administration"***

Guarantor of the professional program – Sergii Prylipko, Doctor of Public Administration, Professor

Department in charge of graduate training:

**Department of Public Administration of Innovation Activity**

Tel.: (044) 527-86-53

E-mail: innovation\_chair@nubip.edu.ua

Head of department – Olha Vytvytska, Doctor of Economics, Professor



**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:                 |
| – Full-time                                      | 15  |
| – Part-time                                      | 10  |
| Duration of Training:                            |   |
| – Full-time educational and professional program | 1,5 years                                   |
| – Part-time                                      | 1,5 years                                   |
| Credits ECTS:                                    |   |
| – educational and professional program           | 90  |
| Language of Teaching                             | Ukrainian                                   |
| Qualification                                    | Master of Management of innovative activity |

**The concept of training**

The urgency of masters preparing of 073 specialty "Management" due to the fact that modern achievements of Ukraine, in term of international dimension of economic competitiveness, level of development and especially the efficiency of the national innovation system, are not sufficient to ensure the development of domestic economy, therefore, 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.

**Areas of employment of graduates**

Master of educational program "Management of innovative activity" can hold positions as managers of enterprises and organizations, in counseling centers, consulting organizations, innovative branches of the central government and regional authorities, innovative funds, innovative financial-credit institutions, scientifically-productional and technical complexes, financially- industrial groups, 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: CJSC «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 for Master Theses**

1. Economic methods managing innovative activities of companies.
2. Formation of competitive advantages in innovative activities of the company.
3. Management commercialization of innovative products the agricultural sector.
4. Formation the strategy of innovative development of enterprises

5. Management of innovation development personnel
- 6.. Management of international innovation projects
- 7.. Information systems in the company's innovation management.
8. Formation of innovative 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>1. 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>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>     |  |                   |                   |
| OB 1   | Optional discipline 1  | 4                 | exam              |
| OB 2   | Optional discipline 2  | 4                 | exam              |
| <b>2. 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  | 5                 | exam              |
| CC 7   | Intellectual property  | 4                 | exam              |
| CC 8   | Information systems and technology of management   | 4                 | exam              |
| CC 9   | Financial and investment management  | 4                 | exam              |
| CC 10  | System analysis and management decisions   | 4                 | exam              |
| CC 11  | Risk management  | 4                 | exam              |
| CC 12  | Strategic management of innovative development   | 5                 | exam              |
| CC 13  | HR management  | 4                 | exam              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional Block by specialty</i>               |  |                   |                   |
| OB 1.1   | Marketing innovation   | 4                 | exam              |
| OB 1.2   | Innovation projects management   | 4                 | exam              |
| OB 1.3   | International management   | 4                 | exam              |
| OB 1.4   | Organization of innovative businesses (English language)   | 4                 | exam              |
| OB 1.5   | Technology transfer  | 4                 | exam              |
| OB 1.6   | Logistical support of innovation   | 4                 | exam              |
| OB 1.7   | Quality management   | 4                 | exam              |
| OB 1.8   | Innovation providing   | 4                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>57</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 14  | Production Practice  | 6                 |                   |
| CC 15  | Preparation and defense of master's work   | 3                 |                   |
| <b>THE TOTAL AMOUNT OF EPP</b>                   |  | <b>90</b>         |                   |

**Annotations of subjects in the curriculum**

**1. 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.

## 2. 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.

**Risk management of agroindustrial production.** Study of the risk processes, factors influencing the increase of risk; review the classification of risks and losses; development mechanism, principles and methods of risk analysis; study measures to

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reduce their level; forming an idea of the problem, risk management and the acquisition of practical skills for the development of risk management in order to optimize the level of risk in the innovation enterprise.

**Strategic management of innovative development.** Mastering the latest knowledge in strategic management of innovative enterprise development and acquisition of practical skills for the development of risk management in order to optimize the level of risk in the innovation enterprise.

**HR management in innovation.** 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**

#### *Optional Block by 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.

**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.

**International management.** The purpose of discipline is to form a system of modern theoretical foundations and international management environment, new technologies, management of international corporations 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.

**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.

**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.

**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.

**Quality management and certification of agricultural products.** Knowledge and skills formation on quality management of innovation activities of enterprises. System quality innovative enterprises.

**Innovation providing.** Forming knowledge about systemology 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.

**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:  |
| – Full-time                                      | 15                           |
| – Part-time                                      | 10                           |
| Duration of Training:                            |                              |
| – Full-time educational and professional program | 1,5 years                    |
| – Part-time                                      | 1,5 years                    |
| Credits ECTS:                                    |                              |
| – educational and professional program           | 90                           |
| Language of Teaching                             | Ukrainian                    |
| Qualification                                    | Master in Extension Services |

**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 for Master Theses**

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.

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>1. 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>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional subjects by Student's Choice</i>     |  |                   |                   |
| OB 1   | Optional discipline 1  | 4                 | exam              |
| OB 2   | Optional discipline 2  | 4                 | exam              |
| <b>2. 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   | Consulting Management  | 4                 | exam              |
| CC 7   | Information Systems and Technologies at Management   | 4                 | exam              |
| CC 8   | HR-management  | 5                 | exam              |
| CC 9   | PR- consulting in Agriculture  | 4                 | exam              |
| CC 10  | Extension Service (in English)   | 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              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional Block by specialty</i>               |  |                   |                   |
| OB 1.1   | Statistical Modeling and Forecasting in Management of Extension Service  | 4                 | exam              |
| OB 1.2   | Strategic Management   | 4                 | exam              |
| OB 1.3   | Interactive Consulting Systems   | 4                 | exam              |
| OB 1.4   | Risk Management  | 4                 | exam              |
| OB 1.5   | Organization of Training in Extension Service  | 4                 | exam              |
| OB 1.6   | Informational and Consulting Support Rural Green Tourism   | 4                 | exam              |
| OB 1.7   | Professional Ethics  | 4                 | exam              |
| OB 1.8   | Information and Consulting Support Sustainable Development   | 4                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>57</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF TRAINING</b>                |  |                   |                   |
| CC 14  | Production Practice  | 6                 |                   |
| CC 15  | Preparation and defense of master's work   | 3                 |                   |
| <b>TOTAL AMOUNT OF EPP</b>                       |  | <b>90</b>         |                   |



## Annotations of subjects in the curriculum

### 1. 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.

### 2. SPECIAL (PROFESSIONAL) TRAINING CYCLE

#### Compulsory components of ERP

**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.

**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.

**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.

**Extension Service) (in English).** The course aims to gain theoretical knowledge and practical skills in the development of agricultural advisory activities, mastering its

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programs, models, methods, technologies, organizing events and feedback, methods of evaluating results.

**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.

### **Optional components of EPP**

#### *Optional Block by 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.

**Strategic Management.** Mastering the latest knowledge in strategic management of innovative enterprise development and acquisition of practical skills for the development of risk management in order to optimize the level of risk in the innovation enterprise.

**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.

**Risk Management.** Study of the risk processes, factors influencing the increase of risk; review the classification of risks and losses; development mechanism, principles and methods of risk analysis; study measures to reduce their level; forming an idea of the problem, risk management and the acquisition of practical skills for the development of risk management in order to optimize the level of risk in the innovation enterprise.

**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.

**Informational and Consulting Support Rural Green Tourism.** The discipline involves studying the experience of formation and development of rural green tourism in Ukraine and the world, its economic, environmental and social aspects, the legal framework, the features of the formation of informational and advisory recommendations for the successful development of tourism in rural areas.

**Professional Ethics.** 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.

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**Training of masters of sciences  
in branch of knowledge "Public management and 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                            | 1,5 years                       |
| Credits ECTS:                          |                                 |
| – educational and professional program | 90                              |
| Language of Teaching                   | Ukrainian                       |
| 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 for Master Theses**

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.

**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>1. GENERAL TRAINING CYCLE</b>                 |  |                   |                   |
| Compulsory components of EPP                     |  |                   |                   |
| 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                 | credit            |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional subjects by Student's Choice *</i>   |  |                   |                   |
| OB 1   | Optional subject 1 *   | 4                 | credit            |
| OB 2   | Optional subject 2 *   | 4                 | credit            |
| <b>2. SPECIAL (PROFESSIONAL) TRAINING CYCLE</b>  |  |                   |                   |
| Compulsory components of EPP                     |  |                   |                   |
| 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              |
| <b>Optional components of EPP</b>                |  |                   |                   |
| <i>Optional subjects by specialty**</i>          |  |                   |                   |
| OB 1.1   | State regulation in agro-industrial complex  | 4                 | exam              |
| OB 1.2   | Public administration of economy and nature management   | 4                 | exam              |
| OB 1.3   | Management of state and municipal lands  | 4                 | exam              |
| OB 1.4   | State mechanisms of anti-crisis management   | 4                 | exam              |
| OB 1.5   | Regional governance and local self-government  | 4                 | exam              |
| OB 1.6   | Public administration of innovation activity   | 4                 | exam              |
| OB 1.7   | Public finance management  | 4                 | exam              |
| OB 1.8   | Public governance  | 4                 | exam              |
| OB 1.9   | Legal regulation in separate spheres and branches  | 4                 | exam              |
| OB 1.10  | State anti-corruption policy   | 4                 | exam              |
| OB 1.11  | Quality management of public services  | 4                 | exam              |
| OB 1.12  | HR management in public authorities  | 4                 | exam              |
| OB 1.13  | Public administration in social and humanitarian sphere  | 4                 | exam              |
| OB 1.14  | Public administration of municipal institutions  | 4                 | exam              |
| OB 1.15  | Management psychology and conflictology  | 4                 | exam              |
| OB 1.16  | Professional ethics in public administration   | 4                 | exam              |
| <b>The total amount of compulsory components</b> |  | <b>50</b>         |                   |
| <b>The total amount of optional components</b>   |  | <b>24</b>         |                   |
| <b>3. OTHER TYPES OF STUDYING</b>                |  |                   |                   |
| CC 12  | Practice   | 5                 | credit            |
| CC 13  | Qualification work (preparing of master's work)  | 9                 |                   |
| CC 14  | Comprehensive qualification Exam   | 1                 | exam              |
| CC 15  | Qualification work (public defense of master's work)   | 1                 | public defense    |
| <b>TOTAL AMOUNT OF EPP</b>                       |  | <b>90</b>         |                   |

\* according to the Catalog of optional subjects for 2020-2021 <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

### 1. 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.

### 2. 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



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**

#### *Optional Block by specialty*

**State regulation of agro-industrial complex.** 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 economy and nature management.** Economy as an object of public administration; the concept of sustainable development; subjects of public administration in the sphere of economy; economic relations as a form of social production; problems of rational use of scarce natural resources by society to meet human needs; micro- and macroeconomic processes; economic growth and economic development of the state; macroeconomic indicators in the system of national accounts, real and nominal values; macroeconomic instability: business cycles (cycle phases and causes of fluctuations), unemployment (basic definitions and measurements), inflation (its types, anti-inflation policy); budget and tax regulation of the economic sphere; state management of nature management: essence and features of monitoring, evaluation and control over consumption of natural resources; approaches to the analysis of the resource potential of the territory.

**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.

**State mechanisms of anti-crisis management.** Characteristics of crisis phenomena; internal and external threats; public administration and crisis; types of crises; multivariate definition of crisis phenomena, causes and consequences of their occurrence; main stages of anti-crisis management; symptoms, causes and state mechanisms of anti-crisis management; the nature and the place of the crisis of personnel management in public authorities; methods of crisis diagnostics; collegial decisions in preventing and overcoming crisis phenomena; foreign experience of anti-crisis public administration.

**Regional governance and local self-government.** National regional policy: subjects of implementation, main goals and objectives; state strategy for regional development; state regional policy for sustainable development of Ukrainian territories;

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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.** 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.

**Quality management of public services.** Content of key concepts, classification, types of public services; client-oriented approach; conceptual foundations for building a

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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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