

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

**MASTER CURRICULA  
AND TRAINING PROGRAMS**

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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. Chyrvynskiy, 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. Mendelejev, 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 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 1,954 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.

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

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

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

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

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

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

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

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

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

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

To expand the educational, research and innovation activities of the National Agrarian University and to satisfy the needs of agricultural, environmental and other industries, as well as to adapt these activities to the requirements of international organizations of research universities, National Agrarian University was renamed into the National University of Life and Environmental Sciences of Ukraine (NULES of Ukraine) by the Resolution of the Cabinet of Ministers of Ukraine № 945 from October 30, 2008, and in 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 36 specialties covering 53 educational programs (table 1)

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

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

**MASTER CURRICULA AND TRAINING PROGRAMS**

<b>Structural subdivision (ERI, faculty)</b>	<b>Specialty</b>	<b>Educational programs</b>
		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
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):
  - "Administrative Management";
  - "Extension Service";
  - "Management of Innovative Activity";
  - "Management of Foreign Economic Activity";

- "Management of Organization and Administration";
- "Management of Investment Activity and International Projects";
- "Management of Educational Institution";
- "Entrepreneurship, Trade and Exchange Activities";
- "Applied economics";
- "Pedagogy of Higher School";
- "Social Work";
- "Quality, Standardization and Certification";
- "Automation and Computer Integrated Technologies";
- "Power Engineering, Electrical Engineering and Electrical Mechanics";
- "Law"

- 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): "Administrative Management", "Extension Service", "Management of Innovative Activity", "Management of Foreign Economic Activity", "Management of Organization and Administration", "Management of Investment Activity and International Projects", "Management of Educational Institution", "Entrepreneurship, Trade and Exchange Activities", "Applied economics", "Pedagogy of Higher School", "Social Work", "Quality, Standardization and Certification", "Automation and Computer Integrated Technologies", "Power Engineering, Electrical Engineering and Electrical Mechanics", "Law".

**Educational program "Administrative Management"** is focused on training highly-professional managers able to manage agrarian business applying appropriate knowledge and skills, modern computer technologies, innovative knowledge and foreign languages. The feature of this program is that learning content is determined by basic education (economic or non-economic) and future employment area. For those with economic basic education, the curriculum includes technological disciplines in the cycle of elective disciplines, for others – economic disciplines.

**Educational program "Extension service"** has been developed to meet the needs of establishing an effective advisory system and information and consultancy service for agricultural producers and the population. Knowledge and practical experience obtained through training will help graduates create their consulting services (firms) to

extend knowledge, information, innovation, using new information technologies with interactive, consulting systems for competitive agricultural production.

**Educational program "Management of Innovative Activity"** focuses on training highly qualified managers with special knowledge in basic education, able to make strategic and tactical managerial innovative solutions, identify the most promising scientific developments and implement them in production on the administrative level of the central state and regional regulatory agencies, counseling centers, innovative financial and credit institutions, agricultural enterprises in accordance with the requirements of international standards.

**Educational program "Management of Foreign Economic Activity"** aims to provide students with in-depth knowledge necessary to make effective decisions in the management of foreign economic activity of agro-food enterprises in the context of globalization and European integration of the national economy of Ukraine. Professional teaching of academic disciplines (some courses are taught in a foreign language) as part of the educational program will enable graduates to gain a competitive advantage in employment in the leading international agribusinesses, agricultural enterprises and organizations.

**Educational program "Management of Organization and Administration"** focuses on training managers of enterprises with different forms of ownership and labour organizations and managers of subdivision in agribusiness with managerial skills both in production and social sphere. The program aims to provide students with efficient knowledge about development of ideas in management, to reveal the essence of modern management provisions, to form the students' ability to effectively apply theoretical knowledge in practice.

**Educational program "Management of Investment Activity and International Projects"**. Training of specialists in developing investment policies and project management of companies, finding international programs, grants and sources of investment meets the need in agro production project-managers, coordinators and project leaders, investment managers and analysts, heads of investment departments and investment advisors. Students are offered opportunities for project drafting and obtaining double degrees at leading educational institutions in Poland.

**Educational program "Management of educational institution"**. Training of managers of enterprises, institutions and organizations (in the sphere of education and industrial training) is caused by the demand in specialists able to carry out work on planning and optimization of the organizational structure of an institution; management of its educational and economic activities; monitoring the implementation of the plan; development of the staff policy of the institution and student contingent.

**Educational program "Stock exchange activities"** focuses on training specialists able to effectively apply the tools of stock market in order to minimize both production and financial risks in almost all spheres of economic activity, to develop and implement the forecasts for domestic and world markets on the whole and within the specific groups of commodities or financial instruments. In addition to their specific specialization, graduates will be able to trade in the commodity and stock markets.

**Educational program "Applied Economics"** provides students with the knowledge in order to successfully solve complex problems in the sphere of increasing competitiveness of agribusiness; application of advanced methods of economic-mathematical modeling to study the dynamics of development in the agrarian sector. The students have an opportunity to master up-to-date software - modeling program package "Wolfram Mathematica".

**Educational program "Pedagogy of higher school".** Training of a university teacher is caused by the demand in specialists able to organize the educational process, methodological and research activities in colleges and vocational schools, promote social development of young people in higher education institutions.

**Educational program "Social Work".** Training of specialists in social work meets the need of our country in the implementation of social and educational assistance, support, protection and rehabilitation of all categories of the population, organization of the social services centers for social protection and assistance, employment and recruitment centers, systems of educational institutions, centers for children's education and upbringing, cultural centers and art schools, social and educational services and clubs, children's and community organizations, guardianship services, juvenile affairs services.

**Educational program "Quality, standardization and certification"** focuses on training specialists able to adapt Ukrainian system of assessment of quality, safety, certification and standardization of AIC products according to international standards and their practical implementation.

**Educational program "Power Engineering, Electrical Engineering and Electrical Mechanics".** The program provides an in-depth study of electrotechnical and electromechanical methods; devices, systems, complexes and elemental base; software and computer technologies in electric energy systems. It trains specialists able to use means for doing electrotechnical research, measuring systems of electrical system parameters, specialized software packages for automated modeling, calculation and design of electrical and electromechanical systems.

**Educational program "Automation and Computer Integrated Technologies".** The program provides training of specialists able to comprehensive approach to problems; development of new and improvement, modernization and exploitation of existing automation systems using modern software, technical and information technologies, doing theoretical research of the subject of system automatisation; reasoning the choice of automation technology, design and development of applied software for different purposes.

**Educational program "Law".** The level of professional tasks, that the masters will solve, is determined by the need to meet the requirements of legal practice as well as their academic and professional mobility. Therefore, the training of qualified specialists in the field of "Law", who work to establish the rule of law in the society and develop legal awareness and legal culture of citizens, is the mission statement of the University.

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.

### **Content Structure of Master educational programs at NULES of Ukraine**

Educational (educational-professional or educational-research) program is a system of educational components at the appropriate level of higher education within the specialty that defines the requirements for the educational level of individuals who can begin training on this program, the list of disciplines and logical sequence of studying them, the number of ECTS credits required for this program, as well as the expected learning outcomes (competences), which an applicant for an appropriate degree of higher education should obtain.

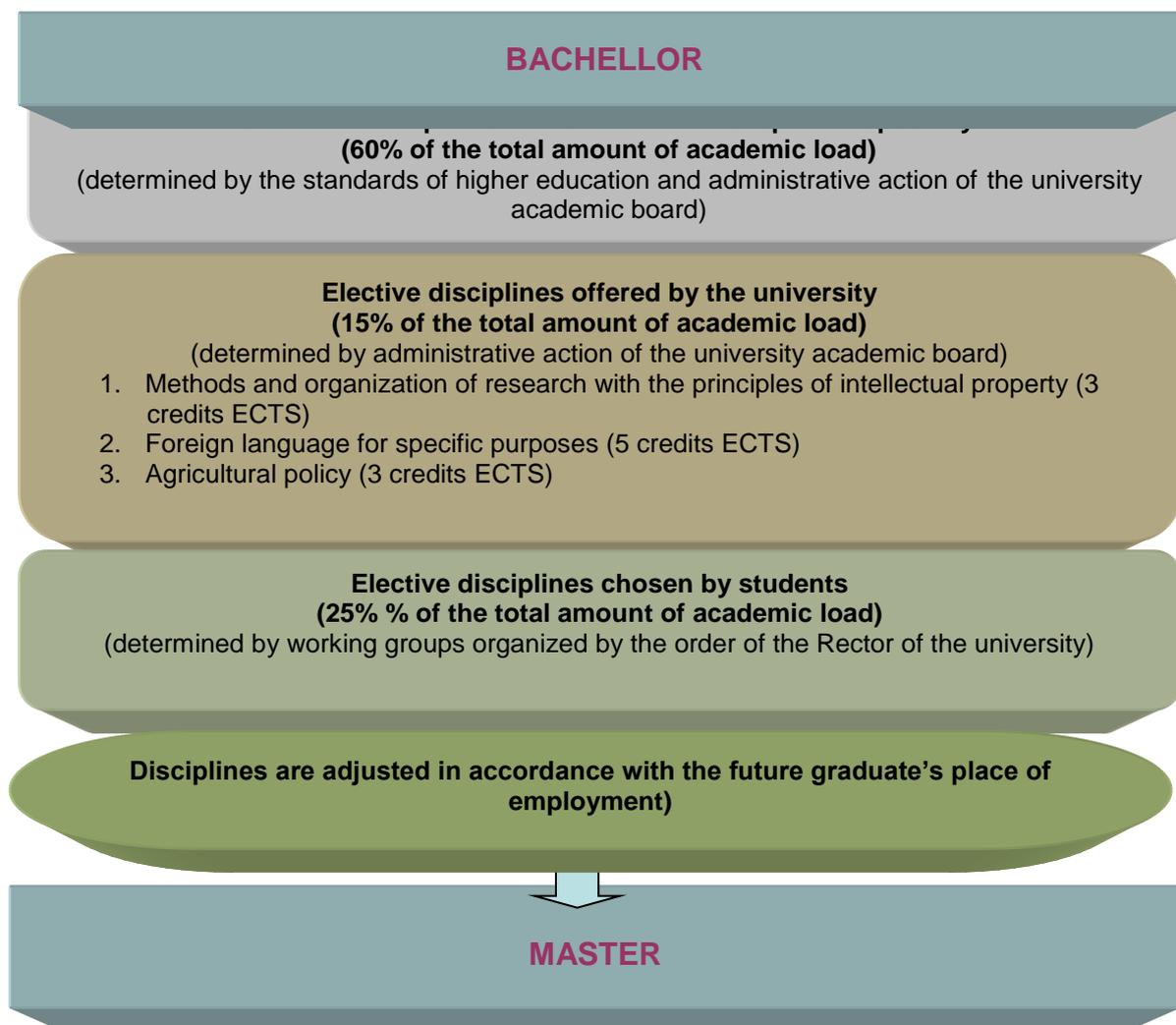


Fig. 1. Content Structure of Master educational programs at NULES of Ukraine

The content structure of Master programs at the NULES of Ukraine includes three discipline blocks.

The list, extent and attestation forms of standard disciplines within the framework of a definite specialty (block 1) are determined by the branch standards of higher education of Ukraine and the administrative action of the academic board of the university. The study of these disciplines provides the basis of specialty and master degree.

The elective part of disciplines determines the basis of educational programs within the relevant specialty. The list, extent and attestation forms of elective disciplines offered by the university (block 2) are determined by the academic board of the university. These disciplines are studied by students during their first year according to educational programs of training. They contribute to masters' future research activities and postgraduate studies, help to master a foreign language, methodology and organization of scientific research and be professionally aware in agricultural issues.

The list of standard disciplines and elective courses offered by the University are the same for all students who study according to the same curriculum, regardless of their chosen major.

The list, forms of study and attestation of elective courses chosen by students (block 3) are defined by working groups organized by the rector's order, are recommended

by the academic boards of the faculties (ERI), approved by educational-methodological council and by the academic board of the University. They are included in the curriculum depending on the student's choice and studied mainly during the second year of study. These disciplines enable the students to write master's thesis and adjust graduates to their future place of employment.

Professional training of students, including the master's rdegree esearch begin in the first semester. A significant part of the training is allotted for independent study.

**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.

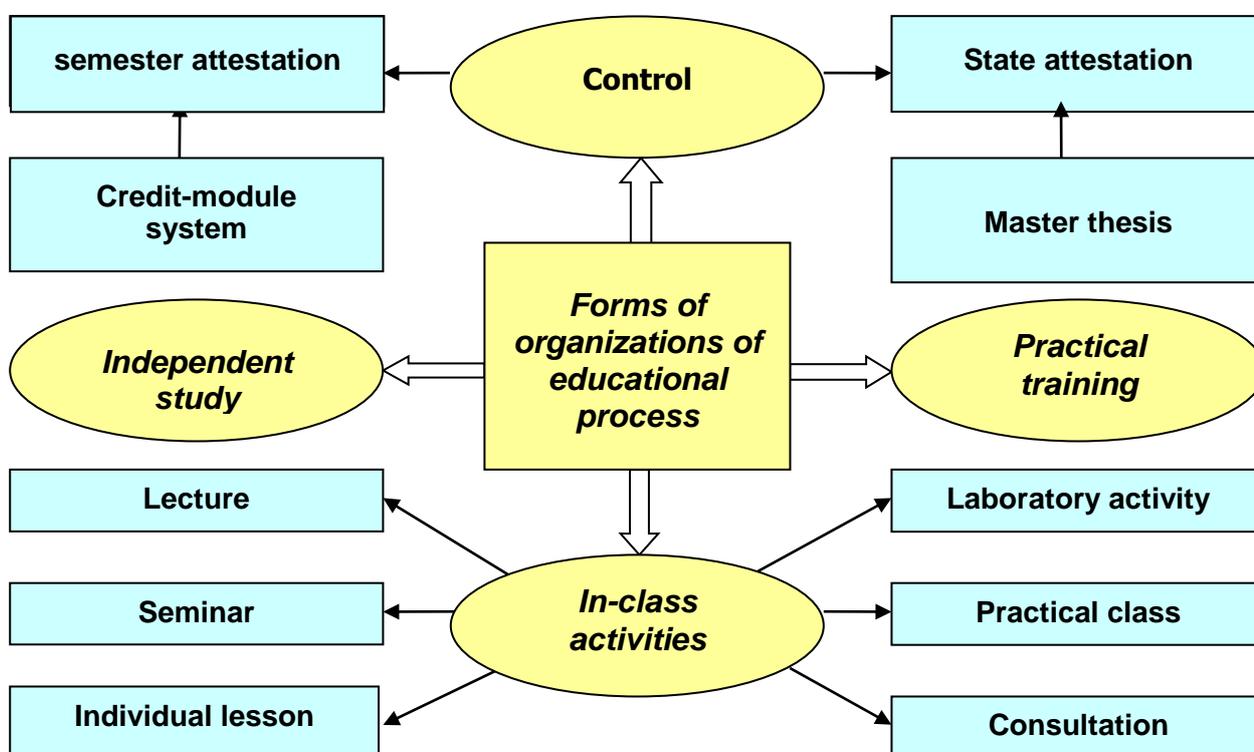


Fig. 2. The main form of implementation of educational process at NULES of Ukraine

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 "Zalischyky Agricultural College named after Khraplyvyi", SS of NULESU "Nizhyn Agro-Technical Institute" (Chernihiv Region);
- Special facilities for practical training of regional higher educational institutions of NULES of Ukraine I-II accreditation levels;
- Botanical garden of NULES of Ukraine.

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

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

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

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

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

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

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

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

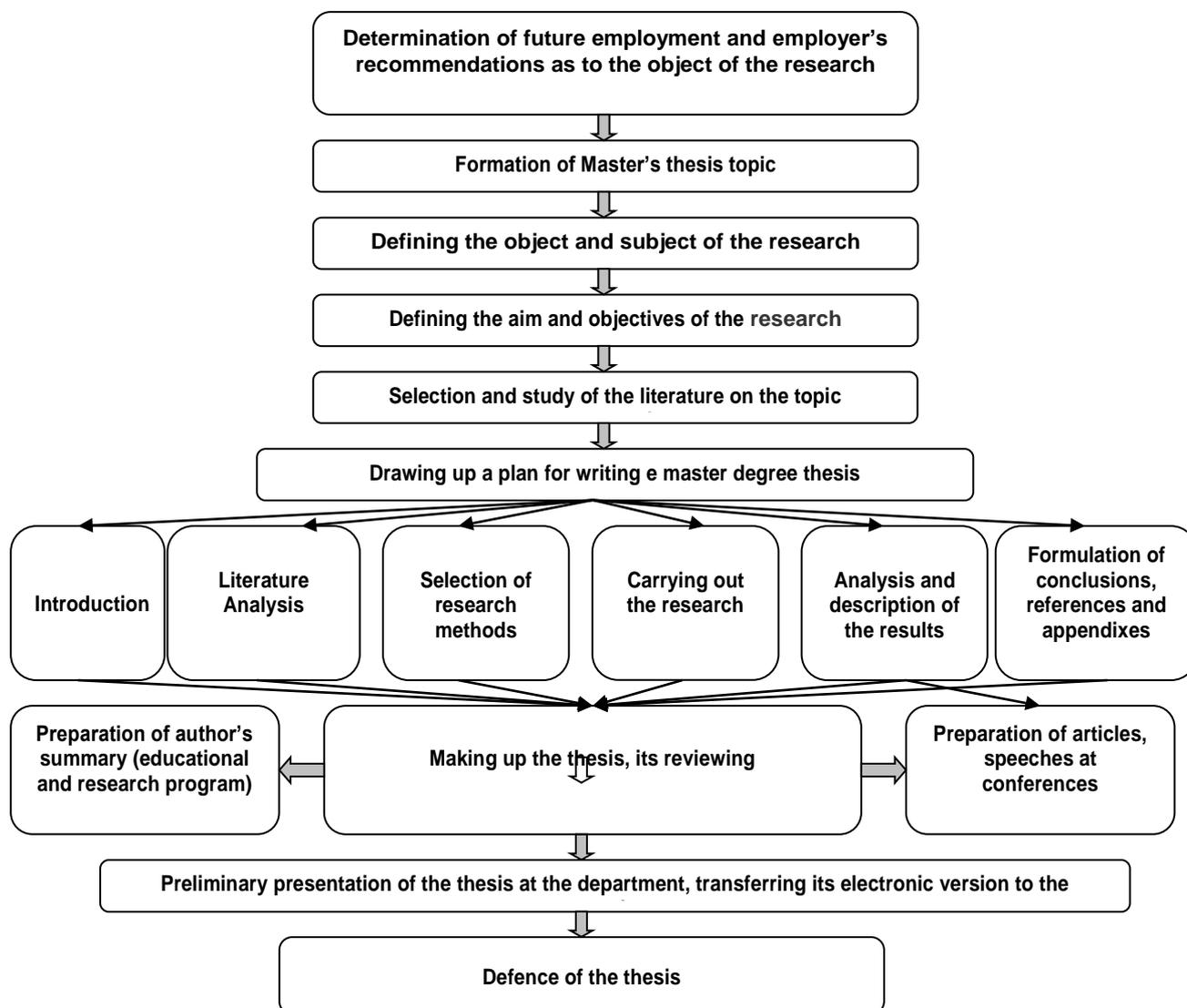


Fig. 3. Stages of writing Master thesis

## 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 1200 educational textbooks, about 550 monographs, more than 3040 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.

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 (<http://library.nubip.edu.ua>);
- 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 56709 items (books, periodicals, instructions for laboratory and practical works).

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

The department has academic and scientific literature in:

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

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

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

Users are provided with:

- 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 900 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 53129 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 24963 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 57875 items (books, periodicals, instructions for laboratory and practical works).

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

The department has academic and scientific literature in:

- 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 14633 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 48735 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).

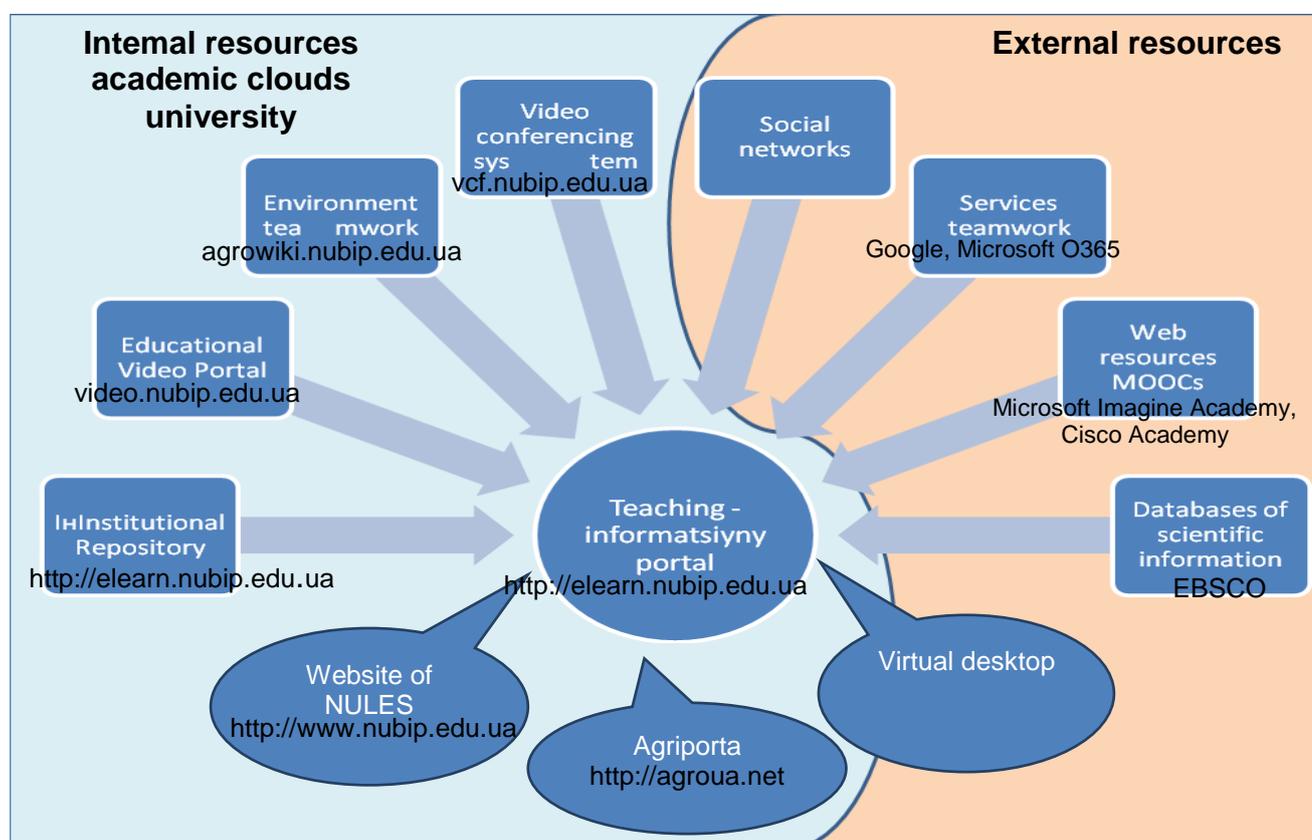


Fig. 4. Hybrid cloud-oriented educational environment at NULES of Ukraine

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 these 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 149 organisations from 41 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 2017, NULESU signed Memoranda of double diploma with universities-partners:

- "International bio-business" in Tokyo agricultural University (Japan);
- 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).

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 2010 to 2016) 5292 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, QANTUS, SOCODEVI, FP-7, 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 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 training is conducted according to governmental order as well as contract with physical persons or entities. Applicants for Master Programs must have basic or full higher education in respective direction (specialty), according to requirements, approved by the rules of admission to Master Degree Programs at the NULES of Ukraine.

To apply for educational programs "Master" on the basis of full higher education, applicant should pay tuition fee (except applicants to the specialty "Public management and administration" at the basic institution of NULES of Ukraine). To apply for EQL Master in specialty 211 "Veterinary Medicine" (applicants are required to have EQL "Junior specialist" in specialty 5.11010101 "Veterinary Medicine" and 212 "Veterinary hygiene, and sanitary expertise" are also admitted applicants who have completed full secondary education.

According to the special rules confirmed by the regulation of the Cabinet of Ministers № 789 "On the approval of the procedure of admission to educational professional program of Masters training in specialty "Public Administration" of the branch of knowledge "Public Service" and employment of graduates" from 29.07.2009, admission to the specialty "Public management and administration" is realized at the basic institution of NULES of Ukraine. Persons that have full higher education, work in public authority and self-government bodies, have at least one year work experience in public authority and self-government bodies and are younger than 45 years old at the moment of documents submission can apply for the above program according to governmental order.

An applicant applying for Master Program shall submit the following documents to the Admission Committee: application to Rector of the University; original of diploma about education obtained (EQL) and an annex to diploma (originals and approved copies); 4 colour photos (size 3x4sm); copy of identification number document, copy of passport (1, 2 pages and the place of registration) and a copy of a military card or a certificate of affiliation to the enlistment office - for those who are liable for military service (except in cases stipulated by law). Passport and other documents giving the right for entrance are shown personally.

The applicant's entrance score consists of the sum of marks of entrance examinations calculated on a scale from 100 to 200 points, inclusive the average score of the annex to diploma about the acquired higher educational level calculated on the 20-point scale (except for the specialty 081 "Law", where the average score of the annex to diploma is not included). Entrance examinations for programs of EQL "Master" are conducted in the form of tests in the complex of fundamental and professionally oriented disciplines of the normative(standard) cycle and foreign language according to the Bachelor program (for applicants in specialties "Public management and administration" – tests in a foreign language, fundamentals of state and law, fundamentals of economics and an interview on public administration; for admission to specialty 081 "Law" - in the form of a single entrance examination in a foreign language, a single professional entrance examination in law, a single professional entrance examination in basic legal competences; for admission to the specialty 051 "Economics" - in the form of a single entrance examination in a foreign language, the complex of fundamental and professionally oriented disciplines of the normative (standard) cycle).

Applicants for master's degree on the basis of bachelor's degree in another specialty, take an additional entrance test.

**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	6.020303	035.041	Philology (german languages and literature) (including translation), the first one is english (English and other foreign language))
		035.043	Philology (german languages and literature) (including translation), the second is german (German and other foreign language))
Economic theory	6.030501	051	Economy (Economics of enterprise) Economy (Economic cybernetics) Economy (Applied economics)
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		
Finance and credit	6.030508	071	Accounting and Taxation (Accounting and audit)
Accounting and audit	6.030509		
Finance and credit	6.030508	072	Finance, Banking and Insurance (Finance and credit)
Human resources management and labour economics	6.030505	073	Management (Management of organization and administration) Management (Management of foreign economic activity) Management (Administrative management) Management (Management of investment activity and international projects) Management ( (Management of innovative activity) Management (Management of educational institution) Management (Extension service)
Management	6.030601		
Marketing	6.030507		
Economics of enterprise	6.030504		
Human resources management and labour economics	6.030505	076	Entrepreneurship, trade and exchange activities
Marketing	6.030507		
Merchandising and commercial entrepreneurship	6.030510		
Geodesy and land management	6.080101		
Consumer services	6.140102		
Law science	6.030401		
Ecology, environmental protection and sustainable development	6.040106	101	Ecology (Ecological control and audit) Ecology (Ecology and environmental protection)
Program engineering	6.050103	121	Software engineering (Information Systems Software)
Computer sciences	6.050101		
Computer engineering	6.050102		
Computer sciences	6.050101	122	Computer science (Information managing systems and technologies) Computer science (Computer ecological and economic monitoring)
Computer engineering	6.050102		
Program engineering	6.050103		

**MASTER CURRICULA AND TRAINING PROGRAMS**

Related Specialties (majors) of educational degree "Bachelor"		Specialties (educational programs) of educational degree "Master"	
title	code	code	title
Computer sciences	6.050101	123	Computer engineering (Computer systems and networks)
Computer engineering	6.050102		
Program engineering	6.050103		
Mechanical engineering	6.050503	133	Industrial mechanical engineering (Machinery and equipment of agricultural production)
			Industrial mechanical engineering (Equipment of forest complex)
			Industrial engineering (Technical service of machines and equipment of agricultural production)
Electrical engineering and electrical technologies	6.050701	141	Power engineering, electrical engineering and electrical mechanics
Electrical mechanics	6.050702		
Energetics and electrotechnical systems in agroindustrial complex	6.100101		
Systems engineering	6.050201	151	Automation and computer integrated technologies
Automation and computer integrated technologies	6.050202		
Networks and systems of postal services	6.050904		
Instrument engineering	6.051003		
Metrology and information and measurement technique	6.051001	152	Metrology and information and measurement technique (Quality, standardization and certification)
Metrology, Standardization and Certification	6.051002		
Instrument engineering	6.051003		
Optoelectronics	6.051004		
Biotechnology	6.051401	162	Biotechnology and bioengineering (Environmental biotechnology and bioenergetics)
Food technologies and engineering	6.051701	181	Food technologies (Technologies of storage, preserving and reprocessing of meat)
Technological expertise and safety of food products	6.051702		Food technologies (Technologies of storage and reprocessing of aquatic bioresources)
Wood processing technologies	6.051801	187	Woodworking and furniture technologies
Construction	6.060101	192	Construction and civil engineering
Hydrotechnics (water resources)	6.060103		
Geodesy, cartography and land management	6.080101	193	Geodesy and land management
Agronomy	6.090101	201	Agronomy (Agronomy)
			Agronomy (Agrochemistry and soil science)
			Agronomy (Selection and genetics of agricultural crops)
Agronomy	6.090101	203	Horticulture and viticulture
Plant protection	6.090105	202	Plant protection and plant quarantine (Plant protection)
			Plant protection and plant quarantine (Quarantine of plants)
Technology of production and processing of livestock products	6.090102	204	Technology of production and processing of livestock products

**MASTER CURRICULA AND TRAINING PROGRAMS**

Related Specialties (majors) of educational degree "Bachelor"		Specialties (educational programs) of educational degree "Master"	
title	code	code	title
Forestry, park and gardening management	6.090103	205	Forestry
Lumbering	6.090104		
Forestry, park and gardening management	6.090103	206	Park and gardening management
Water bioresources and aquaculture	6.090201	207	Water bioresources and aquaculture
Processes, machinery and equipment of agroindustrial production	6.100102	208	Agricultural engineering
Veterinary medicine	6.110101	211	Veterinary medicine
		212	Veterinary hygiene, sanitary and expertise
Social pedagogy	6.010106	231	Social work
Social work	6.130102		
Transport technologies (types of transport)	6.070101	274	Motor Transport
Motor Transport	6.070106		
Transport technologies (types of transport)	6.070101	275.03	Transport technologies (in road transport) (Transport technologies in road transport)

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

Non-related Specialties (majors) of educational degree "Bachelor"		Specialties (educational programs) of educational degree "Master"	
title	code	code	title
Other specialties (majors)		011	Education and Educational Science (Pedagogy of higher school)
Social Care	6.130101	035.041	Philology (german languages and literature) (including translation), the first one is english) (English and other foreign language))
Preschool education	6.010101		
Primary education	6.010102		
Technological education	6.010103		
Professional education (by major)	6.010104		
Remedial education (by nosologies)	6.010105		
Social Pedagogy	6.010106		
Physical education	6.010201		
Sport	6.010202		
Human health	6.010203		
Culture studies	6.020101		
Book science, library science and bibliography	6.020102		
Museology and protection of historical and cultural monuments	6.020103		
Folk arts	6.020104		
Documentation and Information	6.020105		
Management of socio-cultural activities	6.020106		
Theater arts	6.020201	035.043	Philology (german languages and literature) (including translation), the second is german) (German and other foreign language))
Choreography	6.020202		
Film and TV art	6.020203		
Musical art	6.020204		
Arts	6.020205		
Restoration of works of art	6.020206		
Design	6.020207		

**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>
Arts and crafts	6.020208		
Variety and circus art	6.020209		
Art of photography	6.020210		
Philosophy	6.020301		
History	6.020302		
Theology (Theology indicating denomination)	6.020304		
Sociology	6.030101		
Psychology	6.030102		
Practical Psychology	6.030103		
Politology	6.030104		
International relations	6.030201		
International law	6.030202		
International economic relations	6.030203		
International information	6.030204		
Country studies	6.030205		
International business	6.030206		
Journalism	6.030301		
Advertising and public relations (by types of activity)	6.030302		
Publishing and Editing	6.030303		
Law science	6.030401		
Law enforcement activity	6.030402		
Consumer services	6.140102		
Tourism	6.140103		
Electrical engineering and electrical technologies	6.050701		
Agronomy	6.090101		
Technology of production and processing of livestock products	6.090102		
Forestry, park and gardening management	6.090103		
Plant protection	6.090105		
Water bioresources and aquaculture	6.090201		
Processes, machinery and equipment of agroindustrial production	6.100102		
Veterinary medicine	6.110101		
Management	6.030601		
Marketing	6.030507		
Economics of enterprise	6.030504		
Finance and credit	6.030508		
Accounting and audit	6.030509		
Biology	6.040102		
Professional equipment	6.051003		
Hardware	6.0909		
Marketing	6.030507		
Finance and credit	6.030508		
Accounting and audit	6.030509		
Merchandising and commercial entrepreneurship	6.030510	051	Economy (Economics of enterprise) Economy (Economic cybernetics)
Management	6.030601		
Other specialties (majors)		051	Economy (Applied economics)
Economic theory	6.030501	071	Accounting and taxation (Accounting and

**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 cybernetics	6.030502		audit)
International economics	6.030503		
Economics of enterprise	6.030504		
Human resources management and labour economics	6.030505		
Applied statistics	6.030506		
Marketing	6.030507		
Merchandising and commercial entrepreneurship	6.030510		
Economic theory	6.030501		
Economic cybernetics	6.030502	072	Finance, banking and insurance (Finance and credit)
International economics	6.030503		
Economics of enterprise	6.030504		
Human resources management and labour economics	6.030505		
Applied statistics	6.030506		
Marketing	6.030507		
Accounting and audit	6.030509		
Merchandising and commercial entrepreneurship	6.030510		
Management	6.030601		
Other specialties (majors)		073	Management (Management of organization and administration) Management (Management of foreign economic activity) Management (Administrative management) Management (Management of investment activity and international projects) Management (Management of innovative activity) Management (Management of educational institution) Management (Extension service)
Economic theory	6.030501	075	Marketing
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		
Finance and credit	6.030508		
Accounting and audit	6.030509		
Merchandising and commercial entrepreneurship	6.030510		
Other specialties (majors)		076	Entrepreneurship, trade and exchange activities
Other specialties (majors)		081	Law
Chemistry	6.040101	101	
Biology	6.040102		
Geography	6.040104		
Biotechnology	6.051401		
Food technologies and engineering	6.051701		
Agronomy	6.090101		

**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>
Forestry, park and gardening management	6.090103		
Plant protection	6.090105		
Water bioresources and aquaculture	6.090201		
Vocational education (by major)	6.010104		
Technologic education	6.010103		
Management	6.030601		
Law science	6.030401		
Economics of enterprise	6.030504		
Pharmacy	6.120201		
Information and communication systems safety	6.170101	121	Software engineering (Information Systems Software)
Information science	6.040302		
Systems engineering	6.050201		
Applied mathematics	6.040301		
Information and communication systems safety	6.170101	122	Computer science (Information managing systems and technologies)
Systems analysis	6.040303		
Automation and computer integrated technologies	6.050202		
Micro- and nano-systems technology	6.050801		
Telecommunications	6.050903		
Information science	6.040302		
Metrology and information-measuring technologies	6.051001		
Automation and computer integrated technologies	6.050202		
Applied mathematics	6.040301		
Economics of enterprise	6.030502		
Ecology, environmental protection and sustainable development	6.040106	122	Computer science (Information managing systems and technologies)
Information and communication systems safety	6.170101		
Systems analysis	6.040303		
Automation and computer integrated technologies	6.050202		
Micro- and nano-systems technology	6.050801		
Telecommunications	6.050903		
Economic cybernetics	6.030502		
Information science	6.040302		
Systems engineering	6.050201	123	Computer engineering (Computer systems and networks)
Automation and computer integrated technologies	6.050202		
Micro- and nano-systems technology	6.050801		
Hardware devices and systems	6.050802		
Telecommunications	6.050903		
Information and communication systems safety	6.170101		
Technical information protection systems	6.170102		
Information security management	6.170103		
Metrology and information-measuring technologies	6.051001		

**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>
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)
Ecology, environmental protection and sustainable development	6.040106	162	Biotechnology and bioengineering (Environmental biotechnology and bioenergetics)
Chemistry	6.040101		
Food technologies and engineering	6.051701		
Chemical technology	6.051301		
Chemical Engineering	6.051302		
Biology	6.040101		
Agronomy	6.090101		
Technology of production and processing of livestock products	6.090102	181	Food Technologies (Technologies of storage, preserving and reprocessing of meat; Technologies of storage and reprocessing of aquatic bioresources)
Water bioresources and aquaculture	6.090201		
Other specialties (majors)		187	Woodworking and Furniture Technologies
Mechanical engineering	6.050503	192	Construction and civil engineering
Architecture	6.060102		
Transport technologies	6.070101		
Geodesy, cartography and Land management	6.080101		
Geology	6.040103	193	Geodesy and land management
Geography	6.040104		
Construction	6.060101		
Plant protection	6.090105	201	Agronomy (Agronomy; Agrochemistry and Soil Science, Selection and genetics of agricultural crops)
Forestry, park and gardening management	6.090103		
Agronomy	6.090101		
Ecology, environmental protection and sustainable development	6.040106	202	Plant protection and plant quarantine (Plant protection; Quarantine of Plants)
Forestry, park and gardening management	6.090103		
Plant protection	6.090105	203	Horticulture and viticulture
Forestry, park and gardening management	6.090103		
Ecology, environmental protection and sustainable development	6.040106	205	Forestry
Agronomy	6.090101		
Plant protection	6.090105		
Ecology, environmental protection and sustainable development	6.040106	206	Park and gardening management
Construction	6.060101		
Architecture	6.060102		
Agronomy	6.090101		

**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>
Plant protection	6.090105		
Design	6.020207		
Energetics and electrotechnical systems in agroindustrial complex	6.100101	208	Agricultural engineering
Mechanical engineering	6.050503		
Transport technologies	6.070101		
Other specialties (majors)		231	Social work
Mechanical engineering	6.050503	274	Motor Transport
Processes, machinery and equipment of agroindustrial production	6.100102		
Mechanical engineering	6.050503	275.03	Transport technologies (in road transport) (Transport technologies in road transport)
Motor transport	6.070106		
Processes, machinery and equipment of agroindustrial production	6.100102		

**Table 4. Specialties for persons with Master's degree or education qualification 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	071	Accounting and taxation (Accounting and audit)
Other specialties	072	Finance, banking and insurance (Finance and credit)
Other specialties	187	Woodworking and Furniture Technologies
Other specialties	193	Geodesy and land management
Other specialties	205	Forestry
Other specialties	206	Park and gardening management
Other specialties	211	Veterinary medicine

## 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”***

Graduating departments:

##### **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”***

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

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

Tel.: (044) 527-81-02

E-mail: grunt\_nubip@ukr.net

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

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

Graduating department:

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

Tel.: (044) 527-86-26

E-mail: breedingdepartment@gmail.com

Head of department – Candidate of Agricultural Sciences, Associate professor V.L. Zhemoyda

**Specialty 203 “Horticulture and Viticulture”**

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

Graduating departments:

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

Tel.: (044) 527-85-59

E-mail: hortdep@gmail.com

Head of department – Doctor of Agricultural Sciences, Professor T.Y.Kondratenko

**Vegetable Growing and Soil under Cover**

Tel.: (044) 527-81-69

E-mail: ovochi.z@i.ua

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

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

***Master's program "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.

### ***Master's program "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.

### ***Master's program "Production and logistics plant products"***

Master 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.

### ***Master's program "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.

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

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

### **Practical training**

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

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

1. Features of formation of species composition and patterns of germination of weeds in crops agrocenoses.
2. Change in soil fertility and efficiency of growing crops under different farming systems.
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 pisyaukisnoho growing forage crops depending on their species composition in certain languages economy.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Applied ecology and biology of plants	1	120	4
2	Assessment and management of soil quality	1	150	5
3	Agrochemical service in plant growing	1	180	6
4	Adaptive systems of agriculture	1	150	5
5	Innovative technologies in Plant Growing	2	120	4
6	Biological risk factors in agriculture and their control	2	120	4
7	Innovative technologies of processing, storage and processing of crop production	2	150	5
8	Energy-saving technology of growing and harvesting high-protein high-grade feed	2	150	5
9	Genetic resources of plants	2	150	5
<b>Total for standard part</b>			<b>1290</b>	<b>43</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	120	4
2	Business foreign language	1	150	5
3	Agricultural policy	2	120	4
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "The modern farming systems"</b>				
1	The modern farming systems	3	120	4
2	Integrated pest control in modern farming systems	3	120	4
3	Features of growing crops technologies in the current farming systems	3	120	4
4	Quality and logistics crop production in modern farming systems	3	120	4
5	Intensive cultivation technology of forage crops for seed	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.2. Master's program "Adaptive crop"</b>				
1	Adaptive technologies in Plant Growing	3	120	4
2	Seed knowledge of field crops	3	120	4
3	Energetic plant resources	3	90	3
4	Certification and commodity of crop-growing products	3	90	3
5	Crop rotations and tillage in modern farming	3	90	3
6	Modern technologies of unconventional forage crops	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.3. Master's program "Production and logistics plant products"</b>				
1	The modern farming systems	3	120	4
2	Technology seeds and planting material of crops production	3	120	4
3	Technology and chemical control of crop production	3	120	4
4	Material and technical base of crop production logistics	3	120	4
5	Innovative technologies in fodder production	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.4. Master's program "Energy-saving technologies in crop and forage production"</b>				
1	Crop rotation and tillage in modern farming	3	120	4
2	Prognosing and programming of yields field crops	3	120	4
3	Intensive cultivation technology of forage crops for seed	3	120	4

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
4	Natural grasslands in increasing the production of complete feed	3	120	4
5	Energy-saving technologies in the branch of storage and processing	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>Total for elective part</b>			<b>990</b>	<b>33</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1-2	300	10
2	Preparation and defense of master's work	1-3	120	4
<b>Total</b>			<b>420</b>	<b>14</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Annotations of disciplines in the curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**Applied ecology and biology of plants.** The purpose of discipline "Applied ecology and biology of plants" - to form in students of Masters program system of knowledge in ecology and biology of major crops, because ecology became the basis of social development, and a knowledge of biology gives possibility to take account of all the demands of culture in the technological process. Sphere of ecology development includes natural resources, including resources of biosphere origin on which based branch of Plant Growing. In addition, students are introduced with account of biometric indicators and assessment of seeds. In conducting laboratory studies focused on deepening theoretical knowledge from ecology and biology of crops with extensive use of educational and additional scientific literature. Securing of knowledge is provided by problem solving of curriculum. In basis of laboratory exercises are solution of individual tasks under the supervision of a teacher. To determine the level of learning and the discipline rankings used sets of tests, control issues and individual tasks in accordance with the modules: 1. Ecology of crops; 2. Biology of crops. 3. Biometrics.

**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.

**Agrochemical service in plant growing.** The goal of the studding of the theoretical materials and laboratory classes are mastering for master of the agronomy in theoretical knowledge and practical skills into the methods and means of the agrochemical supplying and agrochemical service of the plant growing, the planning and the organization of the agrochemical service, etc. The studding of the course masters receive practical skills in control and realization and application of the chemicals application in agricultural industry, the management and marketing in agrochemical service, organization of the collaboration between commodity producer and organizations in agrochemical service of the different form of the private and determination of the effect of the agrochemical service of the agricultural organization.

**Adaptive systems of agriculture.** 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 Growing.** The purpose of discipline is forming specific experts which understand that every modern intensive agricultural technology is integral, clearly defined and scientifically-based system with a set of essential, interrelated elements that perform a specific function, and all together - function of the system, essence of which is to develop the planned volume and quality of crop production. Special attention is paid to the formation a system of knowledge about patterns of formation effective agrocenosis of crops, their structure and relationships, compensatory ability of plants; photosynthetic activity of plants and plant communities; ways to increase productivity - features of assimilation system development, absorption and using FAR, vegetative mass formation and accumulation of dry matter, other phytometric, physiological and biological indicators of productive process of plants ); understanding of bioenergetic processes that occur in plants and agrocenoses. Particular attention is paid to the presentation of essence, content and features of innovative technologies agricultural enterprises, considered issues of their systematization and classification, analyzes the current state of their implementation in the Ukrainian agricultural sector. To determine the level of learning and the discipline rankings used sets of tests, control issues and individual tasks in accordance with the modules: 1. Agrocenology. 2. Technological innovation is a basis of development and competitiveness of Plant

**Biological risk factors in agriculture and their control.** The course is aimed at highlighting the theoretical concepts of biological risk factors in crop agrobiocenosis and modern approaches to crop protection. It has been made to shape the students a systematic understanding of the place, role and importance of biological risk factors and practical approaches to controlling them in agrobiocenosis in modern farming systems. Describes the relationship between system components agrobiocenosis, laws and rules of their formation and development level and their impact on the yield of crops. The modern approach and level of effectiveness of controls in different farming systems. Topics of laboratory and practical course provides practical skills of students' knowledge of the use patterns of growth and development of biological risk factors and of their impact on crop productivity in developing economically and environmentally acceptable integrated systems protect agricultural crops in different production technologies and farming systems.

**Innovative technologies of processing, storage and processing of crop production.** Discipline teaches features (physical and physiological) of the main groups of products which were grown in crops production, vegetables and horticulture. It teaches basic principles of stabilization (preservation) of any products. Future specialist learns selection regime of short or long-term storage depend on the knowledge obtained features harvest certain crops and basic principles of stabilization. Discipline teaches techniques which bring the harvest of major crops to a stable state. Discipline teaches the way of administration in a certain regime of storage and creating conditions compliance regime under which the storage losses as the quality and quantity will be minimal. The course teaches methods of processing the basic raw material for human food – grain to the flour, cereals and others. Mill farm is the main means for getting of flour, which supplies raw materials bakeries that located in rural areas. The course teaches the technology of grain preparation and production of different grades flour. The course teaches technologies preparation of grain to groats purpose - peas, barley, millet, buckwheat on the rural lines that providing high yields and quality. The course teaches methods of obtaining starch from potato tubers, technologies for production of canned products from vegetables. It gives knowledge about efficient technologies preserving of perishable vegetables

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(tomatoes, cucumbers, peppers) and fruit products than ensuring the efficiency of their production (growing).

**Energy-saving technology of growing and harvesting high-protein high-grade feed.** Identifies ways of intensifying forage production with the introduction of alternative energy and resource saving technologies of fodder plants and production of high-quality, secure cheap feed them without harming the environment.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

### 2.2. Disciplines offered by students

#### 2.2.1. Master's program "The modern farming systems"

**The modern 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.

**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 research schemes of logistics handling, 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 industrial raw materials, 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 material.

**Intensive cultivation technology of forage crops for seed.** The program provides for the disclosure of discipline adaptive cost-effective, environmentally sound technologies for growing forage crops seeds.

### ***2.2.2. Master's program "Adaptive crop"***

**Adaptive technologies in Plant Growing.** The discipline "Adaptive technology in Plant Growing" involves formation of complex knowledge about specific reactions of species, varieties and hybrids of plants on action biotic, abiotic and anthropogenic environmental factors and development of adaptive cultivation technology to obtain stable

yields of quality products based on compliance needs of plants, energy saving and environmental security. Aimed at solving theoretical and practical problems of increasing productivity cultivated species, quality and environmental cleanliness of products, a comprehensive study of forming stable agrocenosis 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 makrostages mikro stages. 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 agrocenosis*. Model of plant and agrocenosis 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 by techniques of analysis seeds sowing qualities and planting material in accordance with

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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.

### ***2.2.3. Master's program "Production and logistics plant products"***

**The modern 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.** Special discipline that studies the equipment and buildings used for storage and processing of plant products, technological characteristics granaries, vegetable warehouses, freezers, refrigerators and buildings for storage of finished canned products, equipment for processing of plant products (cereals, pulses, oil, technical) and raw fruits and vegetables.

**Innovative technologies in fodder production.** Discipline expected to study technologies of field forage crops in the current market conditions.

#### ***2.2.4. Master's program "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. Forecasting as part of yields programming, provides development of forecast, that is to say probable picture of the theoretically possible yield, which provided by resources of climatic factors, soil fertility, fertilizing, crop protection tools etc.

**Intensive cultivation technology of forage crops for seed.** It is assumed disclosure modern adaptive cost-effective and environmentally friendly technologies of high seed yields of forage crops in the current market conditions.

**Natural grasslands in increasing the production of complete feed.** Develop new and improved technology for full, balanced feed on natural fodder lands by modern intensive technologies.

**Energy-saving technologies in the branch of storage and processing.** Discipline is the final in the technology of crop production. This discipline teaches saving technologies obtained of ecologically safe products from plant material. Along with improving the quality of products reduced energy consumption in its production. Discipline teaches energy efficient technologies storage and processing of plant products. Solve problems of ecology and emissions to the environment.

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

**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 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.

***Master's program "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 characteristics of modern instrumental methods of analysis.

### **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 "Ukrzemprom" in the system design and exploration centers "Obldzhrodyuchist" in any agricultural enterprise in positions agronomist, agronomist-ohromika 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 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 "Velykosnytsinske 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 agrocenosis and performance under different tillage systems and crop fertilization.
8. Impact of lithological factor in soil formation tehnzemiv 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.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);

5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Applied ecology and biology of plants	1	120	4
2	Assessment and management of soil quality	1	150	5
3	Agrochemical service in plant growing	1	180	6
4	Adaptive systems of agriculture	1	150	5
5	Innovative technologies in Plant Growing	2	120	4
6	Biological risk factors in agriculture and their control	2	120	4
7	Innovative technologies of processing, storage and processing of crop production	2	150	5
8	Energy-saving technology of growing and harvesting high-protein high-grade feed	2	150	5
9	Genetic resources of plants	2	150	5
<b>Total for standard part</b>			<b>1290</b>	<b>43</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	120	4
2	Business foreign language	1	150	5
3	Agricultural policy	2	120	4
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Agrochemical service and quality management of soil"</b>				
1	The technologies of the soil chemical melioration	3	120	4
2	The system of the modern special agrochemicals application	3	120	4
3	Land Reclamation	3	90	3
4	Soil appraisal	3	90	3
5	Monitoring soil quality	3	90	3
6	The regulation of the crop nutrition for greenhouse and for fertiigation	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>Total for elective part</b>			<b>990</b>	<b>33</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1-2	300	10
2	Preparation and defense of master's work	1-3	120	4
<b>Total</b>			<b>420</b>	<b>14</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Applied ecology and biology of plants.** The purpose of discipline "Applied ecology and biology of plants" - to form in students of Masters program system of knowledge in ecology and biology of major crops, because ecology became the basis of social development, and a knowledge of biology gives possibility to take account of all the

demands of culture in the technological process. Sphere of ecology development includes natural resources, including resources of biosphere origin on which based branch of Plant Growing. In addition, students are introduced with account of biometric indicators and assessment of seeds. In conducting laboratory studies focused on deepening theoretical knowledge from ecology and biology of crops with extensive use of educational and additional scientific literature. Securing of knowledge is provided by problem solving of curriculum. In basis of laboratory exercises are solution of individual tasks under the supervision of a teacher. To determine the level of learning and the discipline rankings used sets of tests, control issues and individual tasks in accordance with the modules: 1. Ecology of crops; 2. Biology of crops. 3. Biometrics.

**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.

**Agrochemical service in plant growing.** The goal of the studding of the theoretical materials and laboratory classes are mastering for master of the agronomy in theoretical knowledge and practical skills into the methods and means of the agrochemical supplying and agrochemical service of the plant growing, the planning and the organization of the agrochemical service, etc. The studding of the course masters receive practical skills in control and realization and application of the chemicals application in agricultural industry, the management and marketing in agrochemical service, organization of the collaboration between commodity producer and organizations in agrochemical service of the different form of the private and determination of the effect of the agrochemical service of the agricultural organization.

**Adaptive systems of agriculture.** 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 Growing.** The purpose of discipline is forming specific experts which understand that every modern intensive agricultural technology is integral, clearly defined and scientifically-based system with a set of essential, interrelated elements that perform a specific function, and all together - function of the system, essence of which is to develop the planned volume and quality of crop production. Special attention is paid to the formation a system of knowledge about patterns of formation effective agrocenosis of crops, their structure and relationships, compensatory ability of plants; photosynthetic activity of plants and plant communities; ways to increase productivity - features of assimilation system development, absorption and using FAR, vegetative mass formation and accumulation of dry matter, other phytometric, physiological and biological indicators of productive process of plants); understanding of bioenergetic processes that occur in plants and agrocenoses. Particular attention is paid to the presentation of essence, content and features of innovative technologies agricultural enterprises, considered issues of their systematization and classification, analyzes the current state of their implementation in the Ukrainian agricultural sector. To determine the level of learning and the discipline rankings used sets of tests, control issues and individual tasks in accordance with the modules: 1. Agrocenology. 2. Technological innovation is a basis of develop ment and competitiveness of Plant.

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**Biological risk factors in agriculture and their control.** The course is aimed at highlighting the theoretical concepts of biological risk factors in crop agrobiocenosis and modern approaches to crop protection. It has been made to shape the students a systematic understanding of the place, role and importance of biological risk factors and practical approaches to controlling them in agrobiocenosis in modern farming systems. Describes the relationship between system components agrobiocenosis, laws and rules of their formation and development level and their impact on the yield of crops. The modern approach and level of effectiveness of controls in different farming systems. Topics of laboratory and practical course provides practical skills of students' knowledge of the use patterns of growth and development of biological risk factors and of their impact on crop productivity in developing economically and environmentally acceptable integrated systems protect agricultural crops in different production technologies and farming systems.

**Innovative technologies of processing, storage and processing of crop production.** Discipline teaches features (physical and physiological) of the main groups of products which were grown in crops production, vegetables and horticulture. It teaches basic principles of stabilization (preservation) of any products. Future specialist learns selection regime of short or long-term storage depend on the knowledge obtained features harvest certain crops and basic principles of stabilization. Discipline teaches techniques which bring the harvest of major crops to a stable state. Discipline teaches the way of administration in a certain regime of storage and creating conditions compliance regime under which the storage losses as the quality and quantity will be minimal. The course teaches methods of processing the basic raw material for human food – grain to the flour, cereals and others. Mill farm is the main means for getting of flour, which supplies raw materials bakeries that located in rural areas. The course teaches the technology of grain preparation and production of different grades flour. The course teaches technologies preparation of grain to groats purpose - peas, barley, millet, buckwheat on the rural lines that providing high yields and quality. The course teaches methods of obtaining starch from potato tubers, technologies for production of canned products from vegetables. It gives knowledge about efficient technologies preserving of perishable vegetables (tomatoes, cucumbers, peppers) and fruit products than ensuring the efficiency of their production (growing).

**Energy-saving technology of growing and harvesting high-protein high-grade feed.** Identifies ways of intensifying forage production with the introduction of alternative energy and resource saving technologies of fodder plants and production of high-quality, secure cheap feed them without harming the environment.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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

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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.

**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.

## 2.2. Disciplines offered by students

### *2.2.1. Master's program "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 for master of the agronomy in agrochemistry and soil science 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 of the agronomy in agrochemistry and soil science 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.

**Soil appraisal.** Soil appraisal is a quantitative assessment of their potential productivity. It is the foundation for quality and economic valuation of land and land cadastre, without which the effective use of land in Ukraine is impossible. The purpose of

discipline is to train highly qualified soil scientists, masters in the field of soil and land. Soil appraisal is the final discipline in the cycle agronomic sciences.

**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 of the agronomy in agrochemistry and soil science 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  
branch of knowledge "Agricultural science and food"  
in specialty 201 "AGRONOMY"**

**in 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

**The concept of training**

Preparation of masters in the field focused on the formation of students knowledge and practical skills in scientific principles of genetics and breeding of field crops, organization and conduct of state of scientific and technical examination of varieties and hybrids of Ukraine, theoretical bases and organization of seed work, development technologies of preserving resources of seed for further growth and stabilization of production of crop products in Ukraine.

A specialist trained to work in research institutions of Ukraine, station of variety testing and research centers, companies different ownership forms of cultivation, preparation and implementation seeds and planting material, as well as educational institutions.

***Master's program "State scientific and technical expertise of plant varieties and their legal protection"***

The main goal of specialization is the acquisition of Master students the necessary theoretical knowledge and practical skills for organizing and conducting the state scientific and technical examination of varieties and hybrids of agricultural crops. The variety 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 people harm flora and fauna, the preservation of the environment. A studying the patentability of plant varieties criteria (novelty, distinction, uniformity, stability) by identifying - morphological description during complex field and laboratory studies necessary to prepare an expert opinion on the application for a plant variety, under which the decision on state registration of the variety and / or rights to it. The study of complex evaluation of plant varieties for biological and morphological characteristics of economically valuable in the complex field and laboratory investigations, which resulted in the decision on state registration of a variety of further entering into the State Register of plant varieties suitable for dissemination in Ukraine.

The 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 .

### Areas of employment of graduates

Ukrainian institute variety examination, agricultural enterprises of different ownership, State centers protection soil fertility and quality crop production; State center of certification and examination agricultural produce; agronomical regional and district administration, leading agro-industrial companies, holding companies and corporations, research institutes of Ukraine.

### Practical training

Students undergo practical training in education and research farm NULES of Ukraine: SS of NULES of Ukraine "Velykosnytynske Education and Research Farm named after O. Muzychenka", SS of NULES of Ukraine "Agronomic Research Station" as well as advanced agricultural enterprises of different ownership, research institutes of Ukraine.

### Proposed Topics for Master Theses

1. Using genetic techniques to create and evaluate initial material in breeding.
2. Assessment of the source material in the breeding process.
3. Characteristics varieties and hybrids of field crops by qualifying examination.
4. Alternative uses of the gene pool of cultivated plants.
5. Study of homozyhotatsiyi the frequency of homologous recombination in *Arabidopsis thaliana*.
6. Morfobiologicheskyy signs of breeding lines of *Phaseolus vulgaris* L. and especially their inheritance.
7. Evaluation samples of soy in the previous sortoispytaniya nursery.
8. Performance and stability harvest genus *Phaseolus* sortoobraztsov.
9. Effect of abiotic factors and micronutrients on seed productivity of new intensive crop varieties.
10. The combination samozapylennyh ability of maize lines.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Applied ecology and biology of plants	1	120	4
2	Assessment and management of soil quality	1	150	5
3	Agrochemical service in plant growing	1	180	6

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
4	Adaptive systems of agriculture	1	150	5
5	Innovative technologies in Plant Growing	2	120	4
6	Biological risk factors in agriculture and their control	2	120	4
7	Innovative technologies of processing, storage and processing of crop production	2	150	5
8	Energy-saving technology of growing and harvesting high-protein high-grade feed	2	150	5
9	Genetic resources of plants	2	150	5
<b>Total for standard part</b>			<b>1290</b>	<b>43</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	90	3
2	Business foreign language	1	150	5
3	Agricultural policy	2	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "State scientific and technical expertise of plant varieties and their legal protection"</b>				
1	Breeding and Seed-growing heterosis hybrids	3	150	5
2	Special genetic field crops	3	150	5
3	Genetics immunity against diseases and pests	3	120	4
4	State qualifying examination	3	180	6
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>Total for elective part</b>			<b>990</b>	<b>33</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1-2	300	10
2	Preparation and defense of master's work	1-3	120	4
<b>Total</b>			<b>420</b>	<b>14</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Applied ecology and biology of plants.** The purpose of discipline "Applied ecology and biology of plants" - to form in students of Masters program system of knowledge in ecology and biology of major crops, because ecology became the basis of social development, and a knowledge of biology gives possibility to take account of all the demands of culture in the technological process. Sphere of ecology development includes natural resources, including resources of biosphere origin on which based branch of Plant Growing. In addition, students are introduced with account of biometric indicators and assessment of seeds. In conducting laboratory studies focused on deepening theoretical knowledge from ecology and biology of crops with extensive use of educational and additional scientific literature. Securing of knowledge is provided by problem solving of curriculum. In basis of laboratory exercises are solution of individual tasks under the supervision of a teacher. To determine the level of learning and the discipline rankings used sets of tests, control issues and individual tasks in accordance with the modules: 1. Ecology of crops; 2. Biology of crops. 3. Biometrics.

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the realization of these objectives. Especially important is the ability to manage processes and soil regimes and on this basis to improve soil fertility.

**Agrochemical service in plant growing.** The goal of the studying of the theoretical materials and laboratory classes are mastering for master of the agronomy in theoretical knowledge and practical skills into the methods and means of the agrochemical supplying and agrochemical service of the plant growing, the planning and the organization of the agrochemical service, etc. The studying of the course masters receive practical skills in control and realization and application of the chemicals application in agricultural industry, the management and marketing in agrochemical service, organization of the collaboration between commodity producer and organizations in agrochemical service of the different form of the private and determination of the effect of the agrochemical service of the agricultural organization.

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**Biological risk factors in agriculture and their control.** The course is aimed at highlighting the theoretical concepts of biological risk factors in crop agrobiocenosis and modern approaches to crop protection. It has been made to shape the students a systematic understanding of the place, role and importance of biological risk factors and practical approaches to controlling them in agrobiocenosis in modern farming systems. Describes the relationship between system components agrobiocenosis, laws and rules of their formation and development level and their impact on the yield of crops. The modern approach and level of effectiveness of controls in different farming systems. Topics of laboratory and practical course provides practical skills of students' knowledge of the use patterns of growth and development of biological risk factors and of their impact on crop productivity in developing economically and environmentally acceptable integrated systems protect agricultural crops in different production technologies and farming systems.

**Innovative technologies of processing, storage and processing of crop production.** Discipline teaches features (physical and physiological) of the main groups of products which were grown in crops production, vegetables and horticulture. It teaches basic principles of stabilization (preservation) of any products. Future specialist learns selection regime of short or long-term storage depend on the knowledge obtained features harvest certain crops and basic principles of stabilization. Discipline teaches techniques which bring the harvest of major crops to a stable state. Discipline teaches the way of administration in a certain regime of storage and creating conditions compliance regime under which the storage losses as the quality and quantity will be minimal. The course teaches methods of processing the basic raw material for human food – grain to the flour, cereals and others. Mill farm is the main means for getting of flour, which supplies raw materials bakeries that located in rural areas. The course teaches the technology of grain preparation and production of different grades flour. The course teaches technologies preparation of grain to groats purpose - peas, barley, millet, buckwheat on the rural lines that providing high yields and quality. The course teaches methods of obtaining starch from potato tubers, technologies for production of canned products from vegetables. It gives knowledge about efficient technologies preserving of perishable vegetables (tomatoes, cucumbers, peppers) and fruit products than ensuring the efficiency of their production (growing).

**Energy-saving technology of growing and harvesting high-protein high-grade feed.** Identifies ways of intensifying forage production with the introduction of alternative energy and resource saving technologies of fodder plants and production of high-quality, secure cheap feed them without harming the environment.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

## 2.2. Disciplines offered by students

### 2.2.1. Master's program *"State scientific and technical expertise of plant*

**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.

**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.

**State qualifying examination** involves the study of complex evaluation of plant varieties for biological and morphological characteristics of economically valuable in the complex field and laboratory investigations, which resulted in the decision on state registration of a variety of further entering into the State Register of plant varieties suitable for dissemination in Ukraine. Discipline will form principles of scientifically proven market monitoring plant varieties. 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.

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

**The concept of training**

Training of master's degree students in specialty is oriented at modern and perspective directions of development in fruit and vegetable growing and viticulture. Training master degree students on specialty foresees the deep specialized training in the sphere of fruit-growing, vegetable-growing of 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 fruit and vegetable products 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 knowledge's and skills of modern technologies in the field of horticulture and viticulture.

***Master's program "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 garden installation, looking after plantation during the vegetation period, ways of growing the planting material, selection of cultivars with useful properties, investigations of cultivar resistance to unfavorable changes of environmental conditions and harmful organisms, prognosis and programming of yield for fruit cultures, methods of computer processing the results of investigations. The gist of program is providing to the students such knowlegies as analyze of technologies for the growing of the vegetable crops, mushrooms ana flowers in different types of greenhouses and their adaptation for the production's terms. Like the acceptable technological deciding that will receive the optimal results as a source's minimization.

**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 products and materials for orchards, vineyards, greenhouses and research institutions.

### Practical training

Students undergo practical training in educational farms NUBiP Ukraine: NULES: SD of NULES "Agronomy Research Station", "Velika Snitinka Training and Research farmstead named after O.V. Muzychenko" as well as advanced agricultural enterprises of different ownership forms, collection nurseries research field NUBiP Ukraine" Produce Garden "research institutions Academy of Agricultural Sciences and National Academy of Sciences of Ukraine, state pomology-ampelografical inspections.

### Proposed Topics for Master Theses

1. The selection of varieties for laying intensive orchards and vineyards by studying their compliance with the requirements of modern gardening.
2. Analysis of market prospects and growing niche horticultural crops.
3. Improving rapid technological elements of growing seedlings of fruit, berry, nut and grape crops.
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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Advanced technologies in horticulture and viticulture	1	300	10
2	Mushrooms cultivation	1	150	5
3	Agribusiness and marketing in gardening, horticulture	1	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
	and viticulture			
4	Quality and logistics for storage, processing of fruit and vegetables	2	120	4
5	Progressiveness technologies of vegetable-growing in field terms and protected cultivated	2	300	10
6	Post harvest handling of fruits, vegetables and grapes	2	150	5
7	Floriculture in open and closed ground	2	150	5
<b>Total for standard part</b>			<b>1290</b>	<b>43</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	2	120	4
2	Business foreign language	1	150	5
3	Agricultural policy	1	120	4
<b>Total (Disciplines offered by University)</b>			<b>390</b>	<b>13</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Horticulture"</b>				
1	Uncommon fruit and berry plants	3	90	3
2	Progressive technologies in nursery	3	120	4
3	Organic vegetable-growing in field terms and protected cultivated	3	180	6
4	Cultivar vegetables	3	120	4
5	Few broaden cultures of the protected cultivated	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>Total for elective part</b>			<b>990</b>	<b>33</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1-2	300	10
2	Preparation and defense of master's work	1-3	120	4
<b>Total</b>			<b>420</b>	<b>14</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Advanced technologies in horticulture and viticulture.** The course studies the agronomic elements of modern intensive technologies cultivation of horticultural products, namely design stands (variety-rootstock combinations, charts planting, crown forms); systems of soil maintenance, irrigation, plant protection, harvesting, storage and marketing of fruit based on analysis of the achievements of advanced domestic and foreign horticultural farms. As a result of the discipline study the student should be able to design, develop and implement advanced technologies of fruit, berries and grapes growing.

**Mushrooms cultivation.** Mycological and biological characteristics cultivated mushrooms. The new investigations results in fungi therapy. History and modern tendencies in mushroom cultivation in all over the world. Organization mushrooms production facilities. Innovation principles of mushrooms complex organization. Aspects of mycelium growing technology. Cultivation of *Agaricus bisporus*. The main fazes of compost creation, covered mixture preparation, technological aspects different mushrooms cultivation. Intensive and extensive growing technologies of *Pleurotus ostreatus* in the world. Cultivations of uncommon mushrooms. Pests and illness in mushrooms cultivation. Ukrainian and European standarts of turn off productions.

**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.

**Quality and Logistics for storage, processing of fruit and vegetables.** Discipline is the final in the technology production of vegetables and fruits. Organization of efficiency logistics harvest of vegetables is not possible without knowledge of the physical and physiological properties of each type of vegetable. If we have knowledge about vegetables as objects of transportation, handling and storage we can provides selection of the best regimes for these processes, the choice of regimes of short-term or long-term storage. Discipline teaches choosing the optimal of terms harvesting vegetables, fruits and berries to provide marketable yield values obtained and depending on its profitability. The course teaches the basic technology of processing of vegetables and fruits, which make it possible with minimal loss and maximum profit function and vegetable sector enterprises producing fruits. The course teaches basic technological features of each type of vegetable, fruit, their suitability for a particular type of processing, canned products get some food and biological value. The course provides knowledge of standardized technologies for finished goods biochemical methods, by heat sterilization. Discipline teaches conducting optimum preparation of raw materials (sorting, cleaning, inspection, cleaning), and the implementation of the basic technological operations (choice of recipes, mode) of the main raw material, spices and others for finished products to the final operation, packaging, heat treatment. It teaches the rules of the technological control on the all operations from processing and storage of finished canned products.

**Progressiveness technologies of vegetable-growing in field terms and Protected Cultivated.** The new foreign technology's elements of vegetable-growing, that few known and unknown in national terms are studied. Foreign experience of organization of the greenhouse's kind and its using in national terms. In the lecture course the questions of the newest technologies of growing vegetables in the open and closed soil, especially soil preparation and fertilization, growing seedlings, general measures of care for plants and harvest. In laboratory classes students are introduced to equipment and farming activities, unknown or little known in domestic greenhouse production. In the discipline of the questions of the newest technologies of vegetable crops, especially soil preparation and fertilization, growing seedlings to open ground, common measures of care for plants and harvest. In laboratory and practical classes taught productivity of vegetable crops in certain climatic conditions, the conditions of use of organic fertilizers, green manure. Rational selection of varieties and hybrids of vegetable crops depending on the

purpose of production. Selection of equipment for specific field work. Selection of highly efficient tank mixes, fertilizers and identify opportunities and amount of irrigation.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

## **2.2. Disciplines offered by students**

### **2.2.1. Master's program "Horticulture"**

**Uncommon fruit and berry plants.** The course forms in future specialists the knowledge and skills of the production technology of rare fruits that are valuable nutrition products and raw materials to processing plants. After study the discipline student should know: state and prospects of the fruit of rare plants, meaning, morphological and biological characteristics of plants, physiology of resistance to environmental factors and patterns of fruiting. Modern technologies of high yields of environmentally friendly fruits of rare fruit and berry crops; able: to design fruit plantations for different ownership entities; design, develop advanced technologies growing production of rare fruit and berry crops, manage processes of formation of a crop; develop and implement measures to improve the quality and reduce the loss of production of rare fruit and berry crops; provide them with high economic efficiency.

**Progressive technologies in nursery.** The course examines modern intensive profitable production technology of planting materials such advances scientific institutions from Ukraine and horticulture best foreign technologies. The basis of the course is to study the system of production healed certified planting material of fruit and berry crops, intensive technology of growing seed and vegetative rootstocks, modern production technology of planting material pome, stone fruit, nut and berry crops. Syllabus also provides on standardization of planting material and modern technologies of storage.

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

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

**Cultivar vegetables.** Cultivar discipline devoted to vegetables and consists of three modules. It serves the origin, history and cultivation vnutrivydovi classification (subspecies, varieties, sort types) of vegetables and melons groups. Quality is the main target of which focused growing technology. Highlighted analysis of high-quality resources in Ukraine and their role in agricultural production products. Deep reasonable selection of varieties and hybrids for specific technologies of growing vegetables and vegetable of different directions. In practical laboratory studies examined specific varieties and hybrids of vegetables and melons different sort types. We study the system approbation and identification signs, especially on examination grades BOC - test vegetables and melons.

**Few broaden cultures of the Protected Cultivated.** The tendencies's of decorativeness cultures growing in Protected Cultivated in historical aspects and now are studied. Winter's gardens, their kinds and growing's technologies. The kind of tropical and subtropical plants, exotic cultures that were growing in greenhouses.

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

**Dean** - doctor in agricultural sciences, professor, academician of the NAAS of Ukraine M.M. Dolya  
Tel.: (044) 527-86-99  
E-mail: zr\_eco\_bio\_dep@i.ua  
Location: Building № 4, Room 42

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

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

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

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"***

##### **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

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

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

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 101 "Ecology"**

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

##### ***"Ecological control and audit "***

Department in charge of graduate training:

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

Tel.: (044) 527-81-95

E-mail: eco\_dep@gmail.com

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

**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	Plant Protection Scientists

**The concept of training**

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

***Master's program "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.

**Sphere of graduates employment**

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.

***Master's program "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.

### **Sphere of graduates employment**

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

### **Practical training**

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

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

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 cenosis structures of basic soil types while different use.
8. Comprehensive effect of herbicides on sowing of cereals, legumes, technical, oil and vegetable crops.
9. Specific composition and bio-ecological features of basic rodents at field crops and measures of their control.
10. Measures of imported vegetable material protection from managed quarantine and unquarantine herbivorous insects.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study" in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Logistic and communications in Plant Protection	1	90	3
2	Standardization and jurisprudence in plant protection	2	90	3
3	Complex systems of crop plant protection from diseases	1	90	3
4	Phytofagous insect management	1	90	3
5	Toxicology of Pesticides	2	120	4
6	Technology of mass rearing of beneficial insects	2	150	5
7	Epiphytotiology	1	90	3
8	Crop Seed pathology	2	90	3
9	Labour protection in plant protection	3	90	3
<b>Total for standard part</b>			<b>900</b>	<b>30</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	90	3
2	Business foreign language	1	150	5
3	Agricultural policy	2	120	4
4	Economic and organization of agricultural service	2	120	4
5	Biosafety in Plant Protection	2	120	4
6	Desinfection of Management objects	1	90	3
<b>Total (Disciplines offered by University)</b>			<b>690</b>	<b>23</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Biological justification of obligate and facultative pathogens control"</b>				
1	Actinomitsetes diseases of plant	3	90	3
2	Physiological and biochemical aspects of plant resistance to disease	3	120	4
3	Mycotoxicology	3	120	4
4	Methods for infectious backgrounds forming in phythopathology	3	90	3
5	Pathogenesis in plant production	3	90	3
6	Pathological process of plants' root system	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.2. Master's program "Phytosanitary monitoring and forecasting"</b>				
1	Experimental research methods in entomology	3	120	4
2	Insect pathology	3	120	4
3	Insects ecology	3	120	4
4	Insect physiology	3	120	4
5	Technical entomology	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>Total for elective part</b>			<b>2190</b>	<b>73</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1,2	330	11
2	Preparation and defense of master's work	3	180	6
<b>Total</b>			<b>510</b>	<b>17</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

## Annotations of disciplines in the curriculum

### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**Standardization and jurisprudence in plant protection.** Discipline "Standardization and jurisprudence in plant protection", including study thus questions, discusses the main normative documents that regulate effective implementation of various technological operations in the protection plants, the main legal aspects the application of different pesticides in crop production. Compiling the content of courses taken into account the laws of Ukraine on standardization and safety of plant products

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

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

**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.

**Technology of mass rearing of beneficial insects.** The course deals with modern technologies of mass rearing of beneficial insects. Course objective is to teach students about theoretical foundation and technologies of laboratory and mass rearing of useful insects, nematodes and mites that is commercially used in green houses and open fields.

**Epiphytotiology.** The program provides for familiarization of students with the science of epiphytoties 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 epiphytoties.

**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, saprotrophytic mycobiota of seed.

**Labour protection in plant protection.** Includes the study of safety in all types of work associated with the use, transport, storage of pesticides, and the laws of Ukraine and instructional materials for the protection of plants, social and legal protection of specialists of this sector.

### 2. ELECTIVE ACADEMIC DISCIPLINES

#### 2.1. Disciplines offered by University

**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.

**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.

**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.

**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.

**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.

## 2.2. Disciplines offered by students

### 2.2.1. Master's program "*Biological justification of obligate and facultative pathogens control*"

**Actinomitsetes 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 actinomitsetes diseases. Diagnostics of symptoms of actinomitsetes diseases, learning methods of agent recovery in pure culture.

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**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.

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

**Methods for infectious backgrounds forming in phythopathology.** 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.

**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 symtomatology, 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.

**2.2.2. Master's program "Phyosanitary monitoring and forecasting"**

**Experimental research methods in entomology.** They are lighted up the modern methods of experiment planning, supervision and accounts, as well as making book-marks, carrying out the experiments, peculiarities of statistical treatment of the research results.

**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 program "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	inspector Plant Quarantine

**The concept of training**

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

***Master's program "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.

**Sphere of graduates employment**

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

**Practical training**

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

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

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 cenossis 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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Civil Defence	1	90	3
2	Labour protection in plant	3	90	3
3	Desinfection of Management objects	2	120	4
4	External and internal quarantine	2	90	3
5	Methods for inspection and examination of objects of regulation	1	90	3
6	Quarantine pests	1-2	210	7
7	Phyosanitary law and international cooperation	2	120	4
<b>Total for standard part</b>			<b>810</b>	<b>27</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	90	3

MASTER CURRICULA AND TRAINING PROGRAMS

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
2	Business foreign language	1	90	3
3	Agricultural policy	2	150	5
4	Economic and organization of agricultural service	2	90	3
5	Biosafety in Plant Protection	2	90	3
6	Desinfection of Management objects	1	90	3
<b>Total (Disciplines offered by University)</b>			<b>690</b>	<b>23</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Quarantine of Plants"</b>				
1	International phytosanitary standards	3	150	5
2	Introductory pests	3	120	4
3	Quarantine pest risk evaluation	3	120	4
4	Geography quarantine organisms	3	150	5
5	Harmful organisms Ukraine in the international phytosanitary	3	150	5
6	Quarantine of forest crops		150	5
<b>Total (Disciplines offered by students)</b>			<b>690</b>	<b>23</b>
<b>Total for elective part</b>			<b>2190</b>	<b>73</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1,2	330	11
2	Preparation and defense of master's work	3	180	6
<b>Total</b>			<b>510</b>	<b>17</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Civil defence.** Is an effort to protect the state citizens from military attacks.

**Labour protection in plant protection.** 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.

**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.

**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.

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

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

**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.

**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.

**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.

## **2.2. Disciplines offered by students**

### **2.2.1 Master's program "Quarantine of Plants"**

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

**Introductory 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.

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

**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.

**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	biotechnologist

**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.

***Master's program "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 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.

***Master's program "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.

### **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).

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Philosophy of science and innovation development	1	90	3
2	Civil defense	2	90	3
3	Strategy of sustainable development of nature and society	1	60	2
4	Applied Genetics with the basics of Cytology	2	90	3
5	Ecology Biotechnology	2	120	4
6	Plant Biotechnology	2	150	5
7	Information Technology	2	90	3
8	Applied Ecology	1	90	3
9	Biological Statistics	3	90	3
<b>Total for standard part</b>			<b>810</b>	<b>27</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Business foreign language	1	120	4
2	Agricultural policy	1	120	4
3	Methodology and organization of scientific research on the basics of intellectual property	1	90	3
4	Instrumental methods of analysis	1	150	5
5	Biosafety	1	90	3
6	Design bioprocess	2	120	4
7	Biotechnology in agriculture and biotechnology in environmental biotechnologies	3	90	3
8	Biomarketing of biotech products	2	60	2
<b>Total (Disciplines offered by University)</b>			<b>840</b>	<b>28</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Biosafety and Bioethics"</b>				
1	Microclonal plant propagation	3	90	3
2	Technology in vitro in crop growing	3	90	3
3	Biotechnology Biosafety	3	90	3
4	Immune Biotechnology	3	90	3
5	Biology of individual	3	90	3
6	Cell selection for resistance	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>540</b>	<b>18</b>
<b>2.2.2. Master's program "DNA-certification and mapping the genome"</b>				
1	Diagnosis and identification of GMO DNA passport	3	120	4
2	Cell and Molecular Biology	3	120	4
3	Population genetics	3	90	3
4	Genetic Engineering	3	90	3
5	Molecular Virology	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>540</b>	<b>18</b>
<b>Total for elective part</b>			<b>2250</b>	<b>75</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical training	1,2	300	10
2	Preparation and defense of master's work	3	150	5
<b>Total</b>			<b>450</b>	<b>15</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

## Annotations of disciplines in the curriculum

### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**Applied Genetics with the basics of Cytology** Mechanisms of destruction of the biosphere, methods and techniques of environmental management. Geotechnological, socioeconomic technological ecological and environmental research, the specific relations between 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.

**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. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

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

**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,

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

## 2.2. Disciplines offered by students

### 2.2.1. Master's program "*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).

**Technologies In vitro in crop growing.** The purpose of this course is to familiarize students with the principles of the use of biological knowledge in the production of valuable products virtually and gain an understanding of modern biotechnological processes based on genetic and cellular engineering.

**Biotechnologies Biosafety.** Provides fundamental knowledge and practical aspects of ecological biotechnology industry, domestic and international legislation on biosafety biotechnology industries, the concept of the basic principles of design and selection of producers of biotechnology, biotechnological aspects of bakery, dairy, meat, alcohol, yeast, sugar, malt, beer and drinks.

**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.

**Biology of individual.** 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.

### **2.2.2. Master's program "DNA-certification and mapping the genome"**

**Diagnosis and identification of GMO, DNA passport.** 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.

**Cell 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.

**Population genetics.** Discipline program provides an opportunity for students to expand knowledge and practical skills in basic and applied aspects of population genetics. Main topics of lectures and workshops include the study of population structure, variability of traits in plants, humans and animals, factors that alter the genetic structure of populations, natural selection, population genetics of modern methods used in agriculture, scientific research, biotechnology, ecology, medicine and genetic engineering.

**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 "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	biotechnologist

**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.

***Master's program "Ecology and protection of aquatic resources  
of the agrarian sphere"***

The training provides the study of purification technology and requirements to the quality of the sources of centralized and decentralized water supply; methodology of environmental assessment of the quality of agrarian sphere water resources; ecological certification of water bodies; ecological safety of water ecosystems; means of sustainable utilization and protection of agrarian sphere water resources and the quality control, ecological problems of irrigation and drained farming; formation of land and water ecosystems development and society economical development ecological bases.

### **Sphere of graduates employment**

The valedictorians of this Master program are engaged with the protection and regeneration of water ecosystems, the ecologically safe use of water bodies and sources and the carrying out of scientific support in scientific researches, planning and surveying works for resource conserving water use in the sphere of water and land resources eco-management under the branches of national economy; they contribute to the improvement of general ecological education of the population, in particular, employing for National Agency of water Resources of Ukraine and its structural divisions (basin, regional department of water resources, channels department), Public Enterprise "Water Exploitation"

#### ***Master's program "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.

### **Sphere of graduates employment**

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

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Civil defense	2	60	2
2	Teaching methods at higher school	2	90	3
3	Pedagogy and Psychology of high school	1	60	2
4	Methods and organization of scientific studies	1	150	5
5	Sustainable development strategy	1	90	3
6	Ecological management and audit	1	120	4
7	Environmental control and management	1	150	5
<b>Total for standard part</b>			<b>720</b>	<b>24</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Agricultural and Ecological policy	1	120	4
2	Production management.	1,2,3	90	3
3	Agricultural radio-ecology	1	120	4
4	Problems of environmental safety and modern concepts of nature use	1	150	5
5	Philosophy of science and innovation development	2	90	3
6	Business foreign language	2	120	4
7	Ecological standardization and certification	2	150	5
<b>Total (Disciplines offered by University)</b>			<b>840</b>	<b>28</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Ecology and protection of aquatic resources of the agrarian sphere"</b>				
1	Monitoring of water quality in the agricultural domain	3	120	4
2	Disposal of sewage, recovery and neutralization	3	180	6
3	Methodology of modern chemical analysis	3	180	6
4	Environmental safety of aquatic ecosystems	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.2. Master's program "Environmental management in the agricultural domain: monitoring, certification, expertise"</b>				
1	Agroecology	3	180	6
2	Ecological expertise in agriculture (agro-biotechnologies)	3	120	4
3	Agro-ecological control and management (monitoring,	3	180	6

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
	certification, management, inspection)			
4	Modern biotechnologies and bio-safety	3	120	4
<b>Total (Disciplines offered by students)</b>				
<b>Total for elective part</b>			<b>600</b>	<b>20</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1,2	390	13
2	Preparation and defense of master's work	3	150	5
<b>Total</b>			<b>750</b>	<b>25</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Annotations of disciplines in the curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**Teaching methodology in higher education.** The discipline provides acquisition of knowledge of the nature of teaching methods and their optimal choice in educational activities. Discloses methods of preparation of lectures and lecturing, giving seminars and workshops. We give a description of the most famous modern teaching methods, recommendations for study and use.

**Pedagogy and Psychology of high school.** The discipline examines the state, structure and methods of modern psychology and pedagogy, the development of creative personality. Generates knowledge of the principles and patterns of training and education of individuality, psychological characteristics of the formation and development of individuality and of individual psychological characteristics causing a specific personal-social behavior, activities and communication, helps to clarify the motives of human actions, to regulate interpersonal relationships.

**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.

**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.

**Environmental control and management.** Studying the peculiarities of monitoring (observing systems) of natural ecosystems, agricultural lands, urban areas, and the formation of an information base for agro-ecological data, methodological techniques for ecosystem quality management, methods for making optimal decisions in managing the development of agrosphere on the basis of environmental laws, allows students to acquire knowledge and skills in collecting ecology, analysis, registration of system, generalized, comprehensive information on the quality assessment of the environment and its documentary support for natural, ecological, social, economic, energy, anthropogenic characteristics of objects of nature protection activity, territories, territorial production groups and complexes, as well as economic objects of various purposes, forms the skills and skills of development of scientifically substantiated recommendations for the adoption of ecologically oriented management decisions.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**Production 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.

**Agricultural Radio-ecology.** 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.

**Problems of environmental safety and modern concepts of nature use.** The discipline generates knowledge about ecologically friendly environment provided by prevention of negative impacts leading to the environmental degradation and risks to human health, the ability to determine the types of environmental safety according to the territorial basis (global international, state-national, regional, local), according to the means of ensuring: technological, ecological (radiological, socio-ecological, economic and natural environmental safety), according to the objects of the environmental safety: the environment and its components, environmental safety of human and human society; skills of development and introduction of modern concepts of management of natural resources aimed to the protection of the environment and public health. Optimization of management of natural resources. Generates knowledge about the conditions of balanced interaction of human society with all natural biomes of the biosphere. Provides the skills to achieve the effective results in management and obtain maximum economic benefit with minimal damage to the environment, consumption of natural resources and their restoration and protection of the environment from pollution and destruction.

**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.

**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.

**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.

## 2.2. Disciplines offered by students

### 2.2.1. Master's program "Ecology and protection of water resources in the agro sphere"

**Monitoring of water quality in the agricultural domain.** Study of the discipline as a part of the final phase of the master's degree in the field of ecology and environment, creating the base of scientific outlook on current knowledge in monitoring of water quality. Mastering the techniques of water quality parameters and their evaluation.

**Disposal of sewage, recovery and neutralization.** Formation of theoretical and practical knowledge of the foundations of modern water treatment technologies with a focus on the problem of purification of agricultural wastewater. Examines and sets the composition of wastewater and pollution, physical and chemical foundations of water and wastewater treatment, water purification methods of waste products and the organization of closed water cycles. Related with the prevention and reduction of waste, its collection and transportation, storage, processing, disposal and removal, disposal and burial, as well as preventing negative effects on the environment and human health.

**Methodology of modern chemical analysis.** The main purpose of the study of the theoretical part of methodology of modern chemical analysis is to provide knowledge about modern methods of analytical chemistry of the environment, the methodology of sample preparation for analysis, exploring mathematical processing of the results of chemical analysis, determination of heavy metals in water and soils and learning new techniques methods of environmental assessment.

**Environmental safety of aquatic ecosystems.** Study of environmental issues and general concepts of ecological status of aquatic ecosystems, the main factors of influence on them, sources of pollution, methods of treatment, transboundary sources of pollution, ecological features of small rivers, lakes, wetland ecosystems.

### 2.2.2. Master's program "Environmental management in the agricultural domain: 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.

**Ecological expertise in agriculture (agro-biotechnologies).** The discipline generates knowledge and skills on a 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, projects for transforming the 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 areas, guarantees of environmentally friendly importation of products and technologies, research and management of human impacts on the environment for technology assessment and environmental risks.

**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-

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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.

**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.

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

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
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Expert on 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.

***Master's program "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.

**Valedictorians sector of employment**

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).

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Civil defense	2	60	2
2	Sustainable development strategy	2	90	3
3	Methods and organization of scientific studies	1	120	4
4	Ecological inspection	1	210	7
5	Ecological management	1,2	210	7
6	Ecological audit	1,2	210	7
<b>Total for standard part</b>			<b>900</b>	<b>30</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Agrarian and Ecological policy	1	120	4
2	Industrial and environmental management	1	90	3
3	Systems analysis of environmental quality	2	90	3
4	Ecological control and safety	2	120	4
5	Business foreign language	2	90	3

MASTER CURRICULA AND TRAINING PROGRAMS

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
6	Regulatory and methodological support of control of expert activity of ecologist	1	90	3
7	Ecological and low regulation of environment	3	90	3
8	Methods of environmental analyses	2	90	3
<b>Total (Disciplines offered by University)</b>			<b>780</b>	<b>26</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Control and expert regulation in the agrosphere"</b>				
1	Ecological expertize and audit of areas and enterprises	3	120	4
2	Soil and environmental monitoring and management of land resources in the agrosphere	3	120	4
3	Professional ecological expert activity	3	120	4
4	Ecotoxicological estimation of pesticides, agrochemicals and technologies	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>480</b>	<b>16</b>
<b>Total for elective part</b>			<b>2160</b>	<b>72</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1,2	180	6
2	Preparation and defense of master's work	3	360	12
<b>Total</b>			<b>540</b>	<b>18</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**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.

**Ecological inspection.** Generates knowledge of the procedures of the influence of society on the environment, monitoring and evaluation of the impact of economic and

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

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

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

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**Agrarian 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

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enterprise. When teaching discipline actively used situational tasks, discussions, presentations.

**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.

**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.

**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.

**Ecological and low regulation of environment.** The purpose of the discipline is to explore the regulation of certain types of economic activity of agricultural enterprises and their legal environment as well as Contractual relationship of agricultural business entities, legal regulation of agricultural lands and other natural resources in agriculture in Ukraine. The discipline involves the study of law and state regulation of legal relationship in the field of environment, natural resources and environmental safety and environmental human and civil rights in Ukraine.

**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 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.

## 2.2. Disciplines offered by students

### 2.2.1. Master's program "*Control and expert regulation in the agrosphere*"

**Ecological expertise and audit of areas and enterprises.** 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.

## FACULTY OF LIVESTOCK RAISING AND WATER BIORESOURCES

**Dean** – Kondratiuk Vadym, Associated Professor, Candidate of Agricultural Science  
Tel.: (044) 527-85-56  
E-mail: vadkondratyk@rambler.ru  
Location: Building № 1, Room. 80

The faculty organizes and coordinates the educational process of educational program in specialty:

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

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

Graduating departments:

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

Tel.: (044) 527-82-30

E-mail: rubansy@gmail.com

Head of Department – Ruban Sergey, Doctor of Agricultural Sciences

##### **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: sychov@ukr.net

Head of Department – Sychov Mykhailo, Associated Professor, Doctor of Agricultural Science

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

Tel.: (044) 527-82-68

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

Head of Department – Losev Aleksey, Associated Professor, Candidate of Agricultural Sciences

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

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

E-mail: zasukha\_y\_u@ukr.net

Head of Department - Doctor of agricultural sciences, Professor Yuri Zasuha.

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

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

Graduating departments:

**Aquaculture**

Tel.: (044) 527-89-65

E-mail: 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

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

**Master course  
branch of knowledge "Agricultural science and food"  
in specialty 204 "TECHNOLOGY OF PRODUCTION AND PROCESSING OF  
LIVESTOCK PRODUCTS"  
in 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 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.

### ***Master's program "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.

### ***Master's program "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.

### ***Master's program "Dairy cattle breeding"***

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

### **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.

### ***Master's program "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.

#### ***Master's program "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, 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.

#### ***Master's program "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.

#### ***Master's program "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.

#### ***Master's program "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.

#### **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 "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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Occupational Health and Civil Defence in Livestock	1	90	3
2	Biological productivity of farm animals	1	120	4
3	Feed resources	1	120	4
4	Process control in livestock	1, 2	90	3
5	Production management in livestock	2	120	4
6	Modern trends of selection in animal husbandry	2	120	4
7	Information technology in animal husbandry	1	120	4
8	Organization of agribusiness	2	120	4
9	Technology of production and processing of livestock products	1, 2	300	10
10	Philosophical biological problems	1	90	3
<b>Total for standard part</b>			<b>1290</b>	<b>43</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	2	90	3
2	Business foreign language	1	150	5
3	Agricultural policy	1	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>

MASTER CURRICULA AND TRAINING PROGRAMS

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Save and use of breeding resources"</b>				
1	Technology breeding of animals	3	150	5
2	Keeping of livestock genetic resources	3	150	5
3	Management of the selection process in livestock	3	120	4
4	Biotechnology of animal reproduction	3	90	3
5	Genetics of quantitative and qualitative characteristics of animals	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.2. Master's program "Animal Feeding"</b>				
1	Animal feeding	3	90	3
2	Evaluation of the quality and nutritive value of feeds	3	90	3
3	Feeding of ruminant animals	3	90	3
4	Feeding monogastric animals and poultry	3	240	8
5	Feeding fish	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.3. Master's program "Dairy cattle breeding"</b>				
1	Physiology of lactation	3	120	4
2	Management of milk productivity	3	120	4
3	Intensive technologies of rearing young cattle stock	3	120	4
4	Management and marketing in dairy farming	3	120	4
5	Quality management in the dairy sector	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.4. Master's program "Specialized beef cattle"</b>				
1	Management of productivity	3	120	4
2	Beef cattle management systems	3	120	4
3	Control of production of products beef cattle	3	120	4
4	Processing beef cattle	3	120	4
5	Production of ecologically pure beef	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.5. Master's program "Technology management in pig farming"</b>				
1	Biology of the pigs	3	120	4
2	Management of feeding and housing pigs	3	150	5
3	Slaughtering pigs and pig of products processing	3	150	5
4	Industrial pig production technology	3	180	6
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.6. Master's program "Modern technologies of industrial poultry"</b>				
1	Technology of production of eggs and meat	3	300	10
2	Breeding business	3	120	4
3	Incubation of the birds eggs	3	90	3
4	Bird biology	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.7. Master's program "The racing industry and sport horse breeding industry"</b>				
1	Global genetic horses resources	3	90	3
2	Racetrack and sports training	3	150	5
3	Horse-breeding	3	120	4
4	Organization of pedigree business in horse breeding	3	120	4
5	Horse biology	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.8. Master's program "Technologies productive use of the capacity of bees"</b>				
1	Biology of bees	3	90	3
2	Breeding and keeping of bees	3	120	4
3	Production, storage and processing of bee products	3	150	5
4	Technological equipment in beekeeping	3	120	4
5	Prevention of diseases of bee colonies	3	120	4

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>Total for elective part</b>			<b>930</b>	<b>31</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1	<b>240</b>	<b>8</b>
2	Preparation and defense of master's work	3	<b>240</b>	<b>8</b>
<b>Total</b>			<b>480</b>	<b>16</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Annotations of disciplines in the curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**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.

**Feed resources.** 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.

**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.

**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.

**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.

**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.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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

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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.

**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.

## 2.2. Disciplines offered by students

### *2.2.1. Master's program "Save and use of breeding resources"*

**Technology breeding of animals.** The program is designed to provide students with theoretical and practical knowledge on various technologies of breeding of farm animals, breeding organization, accounting, calculating the efficiency of breeding activities, forecasting breeding success, determining the impact of various factors on formation of productivity of farm animals.

Students will be able to form skills and abilities to use available information on animal performance, determine the breeding value of animals in the complex sources of information to model and calculate the selection index of animals, specifically conduct the selection of animals based on their connectivity and qualified to solve organizational issues of breeding.

**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.

**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.

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

### ***2.2.2. Master's program "Animal Feeding"***

**Animal feeding.** This discipline studies theoretical aspects of functioning animals such as the consumption of food, the assimilation of digested nutrients and the use of them for vital processes and production. Students will be able to acquire the ability to develop practical control techniques and feeding quality management products on this basis.

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

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

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

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

### ***2.2.3. Master's program "Dairy cattle breeding"***

**Physiology of lactation.** The disciple 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

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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.

**Management and marketing in dairy farming.** The discipline generates the system of knowledge about the nature and content of management and marketing as a business philosophy under conditions of market economy and competition. It examines the nature and concept of management, marketing and market research of dairy products market, system of marketing (mix-marketing) measures and international marketing.

**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.

#### ***2.2.4. Master's program "Specialized beef cattle"***

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

**Beef cattle management systems.** The discipline focuses on the study of the maintenance of beef cattle of different sex and age groups (bulls, cows, calves, calves) of feeding livestock on pasture as the cheapest way to beef production, energy and resource saving technologies, as well as the characteristics of modern systems keeping beef cattle that are used abroad.

**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.

#### ***2.2.5. Master's program "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.

#### ***2.2.6. Master's program "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.

### **2.2.7. Master's program "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.

**Organization of pedigree business in horse breeding.** The key issues are the subject horse breeding structure and brief description of its components, breed creative process as a social need, government measures to promote breeding.

**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.

### **2.2.8. Master's program "Technologies and productive use of bees capacity"**

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

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

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

**Technological equipment in beekeeping.** The discipline the development of new and improvement of existing methods of automated control systems and technological

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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.

**Prevention of diseases of bee colonies.** The discipline studies the importance of compliance with the terms of feeding, keeping and breeding of bees to the prevention of diseases of bee colonies, the biology of pathogens of infectious diseases, ways to spread the losses from diseases and combat them, and the acquisition of skills show signs of morphological changes in species of bees in various diseases in terms of apiaries, select material for laboratory research and carry out recreational activities.

**Master course  
branch of knowledge "Agricultural science and food"  
in specialty 207 "WATER BIORESOURCES AND AGUACULTURE"  
in 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.

***Master's program "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

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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.

### ***Master's program "Commercial fishing"***

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.

### ***Master's program "Protection of Hydro-bioresources"***

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.

### ***Master's program "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

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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.

### ***Master's program "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 committee of fishery of Ukraine in oblast or district fishery protection bodies, in scientific and research enterprises which grow, protect and restore rare or 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.

### ***Master's program "Bio productivity 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.

### **Practical training**

Practical training of Fisheries Department students is a component of the curriculum the students require to obtain necessary qualification, professional skills and abilities. This training is performed at the forefront of modern fishery enterprises under organizational and methodological guidance of Department of Aquaculture's faculty and specialists of the enterprises.

While studying at the University, the students receive a thorough theoretical and practical training in modern laboratories equipped with new equipment, in computer classes as well as at leading fishery enterprises such as PJSC "Kyyivrybhosp", SE "Irkliiv Fishpond", SE "Ukrryba", DG "Great Lubin", PJSC "Hmelnytskrybhosp", PE "Aquarium Technologies", PJSC "Sumyrybhosp", PJSC "Hersonrybhosp", JSC "Vilshanka", ARC "Kherson Fishermen", PJSC "Poltavarybhosp", Fishing Farm "Nyvka", IRG NAAS of

Ukraine, JSC "Chernihivrybhosp", 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 baery* 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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

### Curriculum of Master training in educational program "Water Bioresources and Aquaculture " (educational and professional program of master's training)

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Occupational Health and Civil Defence in fishing industry	1	90	3
2	Communication in the fish farming collectives	1	90	3
3	Information technologies in fish farming	2	90	3
4	Theoretical foundations of fish farming	2	150	5
5	Theory of fish population dynamics	2	120	4
6	Intensive aquaculture technologies	1, 2	240	8
7	Economics of fisheries sector	2	120	4
8	Fisheries research methods	1	90	3
9	Environmental physiology and biochemistry of aquatic organisms	1	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
10	Production management in fishery	2	90	3
11	Philosophical biological problems	2	90	3
<b>Total for standard part</b>			<b>1290</b>	<b>43</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	2	90	3
2	Business foreign language	1	150	5
3	Agricultural policy	1	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Protection of hydrobioresources"</b>				
1	Protection of aquatic organisms	3	120	4
2	Management of of aquatic organisms	3	120	4
3	Protection of water resources	3	120	4
4	Assessment of the ecological state of water bodies	3	120	4
5	Hydro bio facies	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.2. Master's program "Sturgeon breeding"</b>				
1	Biological productivity of sturgeon species	3	120	4
2	Selection of sturgeon breeding objects	3	150	5
3	Sturgeon husbandry in ponds	3	150	5
4	Industrial sturgeon	3	180	6
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.3. Master's program "Commercial fishing"</b>				
1	The productivity of objects of commercial fishing	3	120	4
2	The selection of objects for commercial fishing	3	150	5
3	Technical equipment of commercial fishing	3	150	5
4	Technologies of commercial fishing	3	180	6
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.4. Master's program "Harvested hydrobiological resources"</b>				
1	Industrial ichthyology	3	180	6
2	International regulation of fishing	3	120	4
3	Managing fish productivity of reservoirs	3	150	5
4	Forecasting of productivity of reservoirs	3	150	5
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.5. Master's program "The fauna of the wetlands"</b>				
1	Biology of productivity objects wetland fauna	3	150	5
2	Trofology and animal reproduction	3	150	5
3	Biomonitoring and protection of wetland fauna	3	120	4
4	Resource management of wetland fauna	3	180	6
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.6. Master's program "Bioproductivity of waters"</b>				
1	Hydro bio facies	3	120	4
2	The bio productivity of waters	3	120	4
3	The methodology of evaluation of water bioproductivity	3	120	4
4	Modern methods of hydrobiological researches	3	120	4
5	Management of water productivity	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>Total for elective part</b>			<b>930</b>	<b>31</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production Practice	1	240	8
2	Preparation and defense of master's work	3	240	8
<b>Total</b>			<b>480</b>	<b>16</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

## Annotations of disciplines in the curriculum

### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**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; організувати 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.

**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

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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.

**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.

**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.

**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.

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## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

### 2.2. Disciplines offered by students

#### *2.2.1. Master's program "Protection of hydrobioresources"*

**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.

**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 methods of wastewater treatment (mechanical, chemical, physical-chemical and biological, or when they are used together, combined).

**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.

**Hydro bio facies.** 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.

### **2.2.2. Master's program "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.

### **2.2.3. Master's program "Commercial fishing"**

**The selection of objects for commercial fishing.** 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.

**The productivity of objects of commercial fishing.** Students will learn about ecological and biological peculiarities of main objects of commercial fishing; 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 commercial fishing.** Students will learn about technologies of reproduction and growing aquaculture objects; innovative technologies in commercial fishing; new methods of breeding and cultivating fish in European Union, the USA, Canada, China, etc.; integrated technologies in fisheries.

**Technical equipment of commercial fishing.** 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.

### **2.2.4. Master's program "The fauna of the wetlands"**

**Biology of wetland fauna productivity.** Students study biological potential of wetland fauna for a certain period of time and in certain environmental conditions: marshlandscienega, moss land, bog either artificial or natural, permanent or temporary, static or flowing, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters including areas in which coastal river and sea zones adjacent to the wetlands, and islands can be located. Students learn the possibility of wetland fauna to form medium or maximum biomass, conditions of optimal state of wetland ecosystems in which productivity stability or its growth is achieved.

**Wetland ecology and reproduction of water and wetland fauna.** Students study food chain and animal reproduction in wetlands. A significant variety of habitats is characterized by the same variety of environmental conditions for nutrition and breeding animals. Students study chains of feeding in order to reveal ecosystems of wetlands, to learn each each of its level and condition of ecological resources is necessary to ensure vital issues and animal breeding wetlands.

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, types of water and wetland ecosystems and anthropogenic changes of the environment (climate changes and pollution of the environment)

**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.

### ***2.2.5. Master's program "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.

### ***2.2.6. Master's program "Bioproductivity of waters"***

**Hydro bio facies.** 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 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.

**The bio productivity of waters.** Students will learn about biological process in water plankton benthos, methods of revealing primary plankton product and organic substances destruction in waters, ways of calculating aqua products, general laws of population growth and the increase. Students will also learn about the balance of organic substances and energy and aqua animals participation in the process of transformation in water eco systems. They will study the formation and transformation of substances and energy by means of autotrophic and heterotrophic aquatic component eco systems, factors that limit and stimulate production and destruction processes.

**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.

**Modern methods of hydrobiological researches.** Students will study the methods of selecting and office studies on order to detect qualitative and quantitative content of bacteria-, phito-, and zoo plankton, periphyton, phito and zoo benthos. They will study the peculiarities of diagnoses and systematic features of separate taxonomic groups of ohito plankton, zoo plankton and the evaluation of quality of water according to the level of its development.

## FACULTY OF VETERINARY MEDICINE

**Dean** – Doctor in Biology, Professor, Academician of NAAS of Ukraine Mykola Tsvilikhovskyy

Tel.: (044) 527-82-31

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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 program "Veterinary medicine"*

Graduating departments:

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

Tel.: (044) 527-86-17

E-mail: museum@nubip.edu.ua

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

**Obstetrics, Gynecology and Animal Reproduction Biotechnology**

Tel.: (044) 527-83-46

E-mail: akusherstvo@nubip.edu.ua

Head of Department – Candidate of Veterinary Science, Associate Professor Oleksandr Valchuk

**Veterinary-sanitary examination**

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E-mail: vse@nubip.edu.ua

Head of Department – Doctor of Veterinary Sciences, Professor Olga Yakubchak

**Epizootiology and organization of veterinary medicine**

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Head of Department – Doctor of Veterinary Sciences, Professor Vitaliy Nedosekov

**Parasitology and Tropical Veterinary Medicine**

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E-mail: parazitologia@nubip.edu.ua

Head of Department – Doctor of Veterinary Sciences, Professor Natalia Soroka

**Therapy and clinical diagnosis**

Tel.: (044) 527-87-92

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Head of Department – Candidate of Veterinary Sciences, Associate Professor Vilaliy Kostenko

**Surgery and pathophysiology named after prof. I.O Povazhenko**

Tel.: (044) 527-88-68

E-mail: chirurgia@nubip.edu.ua

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

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

***Educational program "Veterinary hygiene, sanitary and expertise"***

Graduating department:

**Veterinary-sanitary examination**

Tel.: (044) 527-88-41

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Head of Department – Doctor of Veterinary Sciences, Professor Olga Yakubchak

**Hygiene and Sanitation named after A.K. Skorokhodko**

Тел.: (044) 527 -81-56

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Head of Department – DBSc., Professor, Corresponding Member of the NAAS of Ukraine Mykola Zakharenko

**Training of masters of sciences  
in branch of knowledge "VETERINARY MEDICINE"  
in specialty 211 "VETERINARY MEDICINE"  
educational program "VETERINARY MEDICINE"**

Form of training:	Licensed number of persons:
– full-time	350 (based on secondary education)
– part-time	25 (based on the educational level "Specialist")
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 and professional programs of master's training**

***Master's program "Methods of biochemical research"***

Preparation of masters in applied biology specializing on "laboratory work" in the MA program provides training of specialists capable to perform modern biochemical, physicochemical and molecular biological research methods in order to conduct biochemical analysis of the environment and the macro system, analytical, biochemical, physic-chemical analysis of raw materials, food and forages in production laboratories for various purposes.

**Sphere of graduates employment**

Ukrainian Laboratory of Quality and Safety of Agricultural Products and its affiliates, state analytical and diagnostic centers for standardization and certification of agricultural products, research institutes and laboratories of veterinary medicine, analytical laboratories of companies engaged in production, processing, storage and marketing of agricultural products.

***Master's program "Microbiological diagnostic methods in animal husbandry and veterinary medicine"***

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.

### ***Master's program "Pathomorphological diagnostics of animal diseases"***

The program involves the study of the structure of government veterinary laboratories, the main methods of histological studies, pathomorphological diagnostics of diseases of different etiology (bacterial, viral, parasitic, noncontagious, poisoning) in animals of different species.

We study the methodological and methodical features of pathoanatomical diagnostics and formulating of conclusion about the cause of death of the animal based on done preventive and therapeutic measures. The program includes the following courses: quality management laboratory activities, basis of histological techniques and research methods; pathomorphology of animal diseases of different etiologies.

### **Sphere of graduates employment**

Professional activity of veterinary medicine doctor under this program will be carried out in the field of veterinary medicine in positions veterinary pathologist in the regional offices of Veterinary Medicine, Institute of Laboratory Diagnostics and Veterinary Examination, State Veterinary Laboratory of regional and district levels, pig, poultry other types of industrial enterprises, as well as provide solutions for forensic veterinary medicine.

### ***Master's program "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.

### ***Master's program "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.

***Master's program "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.

***Master's program "Veterinary equine welfare"***

Training of specialists of veterinary medicine involves material development of undergraduates related on biotechnology of horse reproduction and other hoofed animals, modern technologies of breeding, housing, feeding and maintenance. During the training masters acquire the latest methods of diagnosis, treatment and prevention of animal diseases.

**Sphere of graduates employment**

Professional activity of graduates by certain program will be associated with the veterinary maintenance of industry in large state stud farms, horse farms, equestrian sports schools, racetracks, divisions of Ministry and border guards, maintenance of individual horse owners and collective farms and wild hoofed animals in nature reserves, innovation and advisory activities.

***Master's program "Providing poultry farming"***

The program provides training for doctors of veterinary medicine who possess theoretical knowledge and practical skills for work in the field of modern poultry farming (technological processes of production, methods ecological safe methods, poultry waste utilization, health and safety requirements for poultry farms, technological schemes of prevention of contagious and noncontagious diseases of poultry, economy of modern poultry farming).

**Sphere of graduates employment**

Practical activities of graduates encompasses national and regional industrial associations poultry farming, National Centre for specialists of veterinary medicine poultry raising, Regional Departments of Veterinary Medicine, commercial egg and poultry meat plants , Incubator stations poultry processing plant etc.

***Master's program "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.

### ***Master's program "Veterinary care of exotic and wild animals"***

The aim of program is to train a doctor of veterinary medicine who has knowledge of biology of exotic and wild animals, their housing, feeding and breeding, diagnosis and prevention of contagious and non-contagious diseases , treatment of animals in conditions of wild fauna or kept in zoos, apartments owners.

### **Sphere of graduates employment**

The field of graduate`s practice may be state-owned enterprises which affiliated to the Ministry of Environment and the State Forestry Committee (national parks, forestry, hunting, nature reserves and wildlife sanctuaries, zoos) research zoological institutions and veterinary clinics for small animals.

### ***Master's program "Veterinary support of pisciculture"***

The master's program provides graduate students to master the knowledge of the fundamentals of development and reproduction, cultivation of fish and other aquaculture objects, quality and safety of fish products, sanitary requirements for water and food for growing fish, diagnosis and prevention of noncontagious diseases and poisonings, infectious and parasitic diseases, carrying out therapeutic measures for diseases of fish and other aquatic organisms, providing hygienic standards and veterinary-sanitary requirements for the technological processes on fish processing plants.

### **Sphere of graduates employment**

Doctor of Veterinary Medicine by the Master's program "Veterinary service of pisciculture" is ready for work on the corresponding positions in the system of the fishing industry of Ukraine, such as fishery, fish processing plant, fishing farm, breeding plants for veterinary welfare of aquaculture of objects.

### ***Master's program "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.

## Educational and research programs of master's training

### ***Master's program "Physiology of higher nervous activity of animals"***

The program aims to train veterinary-scientist who has knowledge about the properties and function of the cerebral cortex, brain's innate and conditioned reflex activity of the organism, classical and modern investigation methods of higher nervous activity, methods of correction of physiological processes towards improving animal productivity and evaluation methods of behavioral acts. In the study is focused on the pathology of higher nervous activity, micro-and ultrastructure of the nervous and endocrine systems, as well as the pharmacodynamics and pharmacokinetics of medicines that act on the nervous and endocrine systems.

### **Sphere of graduates' employment**

Further study in graduate school for fundamental scientific specialties of veterinary and biological profiles, professional activity in research institutions of biological, veterinary and medical standpoints, veterinary clinics for small and exotic animals, breeding and training centers of small and exotic animals, zoos, parks and reserves.

### ***Master's program "Cellular technology in veterinary medicine and biology"***

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.

### ***Master's program "Biomorphology and plastination of vertebrates"***

This program aims to train veterinary-scientist who has knowledge and understanding of the morphological component of the life phenomena knowledge. Assimilation of the Master's program will give the opportunity to shape future professionals synthetic approach to the issues of the organization of animal organisms, that is, to combine holistic organism with its place of existence and way of life with the help of biomorphological researches. Assimilation of the plastination technology or moderate embalming will give opportunity to prepare specialist who is able to make educational and scientific collections of morphological preparations that can be stored for a long time.

### **Sphere of graduates' employment**

Further postgraduate study on research specialty pathology, oncology and morphology of animals, professional work in research veterinary oriented institutions that are dealing with comparative morphology and forensic veterinary medicine problems, Institute of zoology NAS of Ukraine, zoological museums, ornithological stations, dolphinariums, serpentariums and scientific expeditions to investigate wildlife.

### 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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

### Curriculum of Master training in educational program "Veterinary medicine"

№	Name of Academic Discipline	Semester	Number	
			Hours	Credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	History of veterinary medicine	1	60	2
2	Inorganic chemistry	1	120	4
3	Biophysics	1	120	4
4	Latin language (terminology)	1	90	3

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			Hours	Credits ECTS
5	Organic chemistry	2	90	3
6	Medicinal plants	2	60	2
7	Genetics	2	60	2
8	Ecology in veterinary medicine	2	90	3
9	Animal anatomy	1-3	330	11
10	Cytology, histology, embryology	2, 3	210	7
11	Basics of breeding	3	90	3
12	Veterinary microbiology	3	150	5
13	Biochemistry of animals with basics of physical and colloid chemistry	3, 4	240	8
14	Physiology of animals	3, 4	240	8
15	Animal alimentation	4	120	4
16	Informatics and computer engineering	4	60	2
17	Veterinary immunology	4	60	2
18	Veterinary virology	4	120	4
19	Hygiene of animals	4, 5	210	7
20	Biotechnology in veterinary medicine	6	90	3
21	Pathological physiology	5, 6	240	8
22	Operative surgery, topographic anatomy and anesthesiology	5, 6	240	8
23	Clinical diagnostic of internal diseases of animals	5, 6	240	8
24	Pharmacology	5, 6	240	8
25	Pathological anatomy, autopsy and forensics	6-8	300	10
26	Parasitology and invasive disease	6, 7	270	9
27	Veterinary radiobiology	7	150	5
28	Clinical biochemistry	9	120	4
29	Obstetrics, gynecology and animal reproduction biotechnology	7-9	330	11
30	Veterinary toxicology	8	120	4
31	General and special surgery	7-9	270	9
32	Veterinary-sanitary examination	7, 8	240	8
33	Domestic animal diseases	8-10	330	11
34	Epizootology and infectious diseases	8-10	330	11
35	Organization and economy of veterinary affairs	9	120	4
<b>Total for standard part</b>			<b>6150</b>	<b>205</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	History of Ukrainian nationhood	1	90	3
2	Etnoculturology	1	90	3
3	Ukrainian language (for professional purposes)	1	90	3
4	Philosophy	2	90	3
5	Foreign Language	1, 2	150	5
6	Physical Education	1-4	-	-
7	Agricultural policy	4	90	3
8	Life safety	5	90	3
9	Methodology and organization of scientific research on the basics of intellectual property	10	90	3
10	Business foreign language	10	90	3
11	Personal legal culture	10	90	3
<b>Total (Disciplines offered by University)</b>			<b>960</b>	<b>32</b>
<b>2.2. Disciplines offered by students</b>				
<b>Educational and professional programs of master's training</b>				
<b>2.2.1. Master's program "Methods of biochemical research"</b>				
1	Quality management of the laboratory	12	300	10
2	Modern methods and instruments biochemical research	11	540	18
3	Special biochemistry	11, 12	600	20
<b>2.2.2. Master's program "Microbiological diagnostic methods in animal husbandry"</b>				

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			Hours	Credits ECTS
<b><i>and veterinary medicine"</i></b>				
1	Quality management of the laboratory	12	300	10
2	Biology of microorganisms	11, 12	540	18
3	Methods for microbiological testing	11, 12	600	20
<b><i>2.2.3. Master's program "Pathomorphological diagnostics of animals diseases"</i></b>				
1	Quality management of the laboratory	12	300	10
2	Pathomorphology animal diseases by type	11, 12	540	18
3	Fundamentals of histological techniques and histological research methods	11, 12	600	20
<b><i>2.2.4. Master's program "Preventive veterinary technologies of Animal Health Providing"</i></b>				
1	Preventive technologies to ensure the health of productive animals	11, 12	480	16
2	Preventive technologies to ensure the health of horses	12	480	16
3	Preventive technologies to ensure the health of small animals	11	480	16
<b><i>2.2.5. Master's program "Veterinary welfare of cattle, sheep and goats"</i></b>				
1	Innovative technologies nutrition, genetics and breeding of cattle, sheep and goats	11	240	8
2	Preventive veterinary technology non-communicable diseases of ruminants	11, 12	600	20
3	Preventive veterinary technology communicable diseases of ruminants	11, 12	600	20
<b><i>2.2.6. Master's program "Providing of pig breeding"</i></b>				
1	Innovative technologies nutrition, genetics and breeding pig	11	240	8
2	Preventive veterinary technology non-communicable diseases of pigs	11, 12	600	20
3	Preventive Veterinary Technology contagious disease of pigs	11, 12	600	20
<b><i>2.2.7. Master's program "Veterinary equine welfare"</i></b>				
1	Innovative technologies nutrition, genetics and horses breeding	11	240	8
2	Preventive veterinary technology non-communicable diseases of horses	11, 12	600	20
3	Preventive veterinary technology contagious disease of horses	11, 12	600	20
<b><i>2.2.8. Master's program "Providing poultry farming"</i></b>				
1	Innovative technologies nutrition, genetics and poultry breeding	11	240	8
2	Preventive veterinary technology non-communicable diseases of poultry	11, 12	600	20
3	Preventive veterinary technology contagious disease of poultry	11, 12	600	20
<b><i>2.2.9. Master's program "Veterinary welfare of dogs and cats"</i></b>				
1	Innovative technologies nutrition, genetics and dogs and cats breeding	11	240	8
2	Preventive veterinary technology non-communicable diseases of dogs and cats	11, 12	600	20
3	Preventive veterinary technology contagious disease of dogs and cats	11, 12	600	20
<b><i>2.2.10. Master's program "Veterinary care of exotic and wild animals"</i></b>				
1	Housing, feeding and reproduction of exotic and wild animals	11	360	12
2	Modern diagnosis and treatment of non-communicable diseases exotic and wild animals in the non-contagious diseases	11, 12	360	12
3	Infectious diseases of exotic and wild animals	11, 12	360	12
4	Parasitic diseases of wild and exotic animals	11	360	12
<b><i>2.2.11. Master's program "Veterinary support of pisciculture"</i></b>				
1	Hygiene and Sanitation in fish farming	11	360	12
2	Diseases of fish	11, 12	360	12
3	Hygiene and Sanitation fish processing companies	11, 12	360	12
4	Aquaculture	11	360	12
<b><i>2.2.12. Master's program "Veterinary Pharmacy"</i></b>				

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			Hours	Credits ECTS
1	Pharmacognosy, Pharmaceutical Chemistry and Toxicological Chemistry	11, 12	360	12
2	Pharmacy and pharmaceutical technology	11	360	12
3	Clinical Veterinary Pharmacology and Clinical Veterinary Pharmacy	11	360	12
4	Preclinical and clinical studies of drugs	11, 12	360	12
<b>Educational and research programs of master's training</b>				
<b>2.2.1. Master's program "Physiology of higher nervous activity of animals"</b>				
1	Physiology of higher nervous activity and zoopsychology	11, 12	480	16
2	The pathophysiology of higher nervous activity	11, 12	480	16
3	Pharmacodynamics and pharmacokinetics of drugs	11	240	8
4	Histology of the nervous and endocrine systems	12	240	8
<b>2.2.2. Master's program "Cellular technology in veterinary medicine and biology"</b>				
1	Clinical animal pathophysiology	11, 12	360	12
2	Molecular biology of the cell	11	360	12
3	Theory and practice of using stem cells in veterinary medicine	11, 12	180	6
4	Oncology and transplantology in veterinary medicine	12	180	6
5	Molecular mechanisms of cellular and humoral immunity in animals	11	360	12
<b>2.2.3. Master's program "Biomorfology and plastynation of vertebrates"</b>				
1	Anatomical museum appliances	11	240	8
2	Evolutionary biomorfology of vertebrates	11, 12	600	20
3	Methods of scientific and morphological studies	11, 12	600	20
<b>Total (Disciplines offered by students)</b>			<b>2160</b>	<b>72</b>
<b>Total for elective part</b>			<b>3120</b>	<b>104</b>
<b>3. OTHER TYPES OF STUDY</b>				
1	Teaching practice	2,4,6,8,10	600	20
2	Practical training	10, 12	600	20
3	Preparation and defense of master's work	12	90	3
<b>Total for educational program</b>			<b>10800</b>	<b>360</b>

**Annotation of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**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.

**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.

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

**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.

**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.** 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.

**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.

**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

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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.

**Biotechnology in veterinary medicine.** The genetic and cellular engineering, Immunobiotechnology, applied biochemistry, enzymology engineering, industrial engineering or microbiology. Transplantation of embryos, early sex determination and regulation of animal cloning and transgenic reception, monozygotic and bizarre animals. Hybridoma technology for monoclonal antibodies and their use.

**Pathological physiology.** General patterns of emergence, development and completion of the disease. Nosology. Role of reactivity in pathology. Classification characteristics, of typical pathological processes; inflammation, disorders of tissue growth, typical regional blood flow, metabolism, acid-base balance, thermoregulation; hypoxia, starvation. Adaptive-compensatory reactions in animals aimed at eliminating violations. Pathological physiology of organs and systems.

**Operative surgery, topographic anatomy and anesthesiology.** Study of surgical operations due to the topographic anatomical features of animals' specific body parts. Anesthesiology; fixing, overthrow and medical reassurance. Technology and organization of mass operations. Prevention of infection in the doctor of veterinary medicine work. Injection and puncture. Desmurgy. Surgical operations on parts of animal bodies.

**Clinical diagnostic of internal diseases of animals.** Methods and clinical research of various animals, their application in the study of individual organs and systems; symptoms, syndromes and main stages of disease recognition. Special methods of individual organs and systems investigation, Detection of diseases in animals.

**Pharmacology.** Pharmacodynamics of drugs. Conditions affecting the action of drugs. Key features and pharmacokinetic characteristics of different groups of drugs, their dosage. Recipe and technology of dosage forms.

**Pathological anatomy, autopsy and forensics.** General patanatomy. Death and posthumous changes. Compensatory and recovery processes. Inflammation. Immunomorphology and Immunopathology. Special pathological anatomy, diseases of the respiratory, digestive, cardiovascular, genitourinary and nervous systems. Diseases of skin. Pathomorphology of infectious diseases. Sectional course. Forensic veterinary examination. Processual part. Special part.

**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.

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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 .

**Veterinary-sanitary examination.** Rules and methods of veterinary-sanitary assessment of animal origin products and basis of technology and standardization of production. Examination of slaughter products from healthy and sick animals, food poisoning and toxicity. Fundamentals of technology and health preservation; production hygiene, veterinary-sanitary inspection of eggs, milk and milk products, meat, wild industrial animals, birds, fish and meat of marine mammals. Veterinary-sanitary inspection of food in the markets.

**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.

**Organization and economy of veterinary affairs.** 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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by 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

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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 (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.

## 2.2. Disciplines offered by students

### Educational and professional programs of master's training

#### 2.2.1. Master's program "Methods of biochemical research"

**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.

**Modern methods and instruments biomedical research.** Discipline is studying advanced electrochemical, spectrometric and chromatographic techniques and instrumentation laboratory tests used to monitor the quality and safety of agricultural products, food products and environmental objects. It provides basic knowledge for laboratory professionals.

**Special biochemistry.** There is a basic discipline within which we study in depth knowledge of the biochemical processes occurring in living organisms, the pathological changes poisoning chemicals and manufacturing techniques and keeping livestock production. Deepening knowledge of biochemistry play a special role in the formation of professional biology and contribute to better learning of sciences master's program.

**2.2.2. Master's program "Microbiological diagnostic methods in animal husbandry and Veterinary Medicine"**

**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.

**Biology of microorganisms.** Discipline provides for the formation of future professionals in environmental and biological thinking, knowing their possible effect phenomena caused by microorganisms (viruses) in animals, raw foods and various environmental objects.

**Methods for microbiological testing.** The basic goal of discipline is to master modern methods of detecting microorganisms and viruses. Diagnosis of bacterial and viral infections in animals. Modern immunological (serological) methods for diagnosis of infectious diseases, determine the tension immunity.

**2.2.3. Master's program "Pathological diagnostics of animals diseases"**

**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.

**Pathomorphology animal diseases by type.** In the discipline of data considered pathomorphological changes in diseases of different etiology (bacterial, viral, parasitic etc.) in different species of animals, large and small ruminants, horses, pigs, dogs, cats, exotic animals and birds. We study the method of organizing and conducting postmortem autopsy of animals of different species on the basis of the current legislation of Ukraine. Methodological and methodical features performances postmortem diagnosis and formulating a conclusion about the cause of death of the animal performed based preventive and therapeutic measures.

**Fundamentals of histological techniques and histological research methods.** In the discipline of data examined histological laboratory equipment, preparation utensils, tools, devices, fixing agents, dyes and reagents for histological studies and data about the stages of making histological preparations (selection of material, its fixation, washing, drying, packing, production cuts and coloring different methods), the creation of the painted sections in balsam or other medium. In addition, students are introduced to the safety at work in histological laboratory microscopy technique made histopreparations and documentation of research results.

**2.2.4. Master's program "Preventive Veterinary Technology 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.

#### ***2.2.5. Master's program "Veterinary welfare of cattle, sheep and goats"***

**Innovative technologies of nutrition, genetics and breeding of cattle, sheep and goats.** Discipline is aimed at in-depth study of the properties of feed nutrients absorption and conversion in the body of ruminants. The nutrient requirements depending on the direction and production technology, innovative technologies of feeding ruminants.

**Preventive veterinary technology non-communicable diseases of ruminants.** Discipline studies preventive veterinary measures for the emergence of diseases related with metabolic disorders, hormonal disorders, vitamin and mineral nutrition. Prevention of infertility and obstetric pathology in cows, sheep and goats, modern methods of reproduction of ruminants. Prevention of surgical pathology and modern technology in veterinary surgery.

**Preventive veterinary technologies of communicable diseases of ruminants.** Discipline is studying advanced technological schemes of diagnostic tests and prevention of infectious and parasitic diseases of ruminants. Vaccine prophylaxis of infectious diseases of ruminants, the use of serum, immunoglobulin, preparations which have interferonogens action. Prevention of helminthoses and diseases caused by protozoa.

#### ***2.2.6. Master's program "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

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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.

#### ***2.2.7. Master's program "Equine veterinary welfare"***

**Innovative technologies nutrition, genetics and horses breeding.** Discipline aims to provide future professionals in-depth knowledge about the properties of an innovative nature nutrient feed control full feeding horses. The nutrient requirements depending on the direction of the industry (breeding horse breeding, stud, sport horse breeding, horse jobs). Modern technologies of breeding horses. Genetic database breeding and their use. Veterinary Genetics.

**Preventive veterinary technology non-communicable diseases of horses.** Discipline studies preventive veterinary measures for the emergence of diseases associated with metabolic disorders, hormonal disorders, vitamin and mineral nutrition. Prevention of infertility and obstetric pathology in mares, modern methods of breeding horses. Features surgical pathology horses and their prevention. Modern Veterinary Surgery and Anesthesiology especially horses.

**Preventive veterinary technology contagious diseases of horses.** Discipline focused on the study of modern technological schemes diagnostic tests and preventive measures for infectious and parasitic diseases of horses. In the course of study students will learn morphological features and life cycle of pathogens and their systematic position, epizootology, pathogenesis and formation of immunity in horses. Prevention helminthoses, acaroses, entomoses and diseases caused by protozoa.

#### ***2.2.8. Master's program "Providing poultry farming"***

**Innovative technologies nutrition, genetics and poultry breeding.** The discipline studying poultry need the nutrient feed, modern technology feeding of different species (chickens, ducks, geese, turkeys, pheasants, guinea fowl, quail), depending on the direction of production (meat or poultry egg) control full feeding. Features of breeding birds. Methods for determining the performance and value of poultry breeding, Creating lines and crosses. Veterinary Genetics. Methods for genetic studies, chromosomal and genomic mutations determining mutagenic environment.

**Preventive veterinary technology non-contagious diseases of poultry.** Discipline is studying advanced circuit techniques and means of preventing non-communicable diseases during the growing broiler poultry and egg productivity directly (prevention of metabolic disorders, vitamin and mineral nutrients). Poisoning prevention of poultry from harmful air substances (ammonia, hydrogen sulfide, carbon dioxide) and feed components of natural and anthropogenic approval (mycotoxins, heavy metals, sodium chloride, urea).

**Preventive Veterinary Technology contagious diseases of poultry.** Discipline focused on the study of modern technological schemes diagnostic tests and preventive measures for infectious and parasitic diseases. Vaccine Infectious Diseases parent flock birds, chickens and egg productivity when growing broilers. Application of biological products that enhance natural resistance and resistance (immunoglobulins preparations possessing interferonogens action). Prevention of helminthoses, acaroses, entomoses, diseases caused by protozoa.

**2.2.9. Master's program "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.

**2.2.10. Master's program "Veterinary care of exotic and wild animals"**

**Housing, feeding and reproduction of exotic and wild animals.** The discipline studying the characteristics of a place in the animal world and the importance for humanity and environment at all major species of exotic and wild animals (wild Artiodactyles and odd-toed, primates, animals, rodents, reptiles birds). Features of housing, feeding, reproduction in captivity.

**Modern diagnosis and treatment of non-communicable diseases exotic and wild animals in the non-contagious diseases.** Learn the latest methods of research animals, such as endoscopy (laparoscopy, gastroscopy, esophagogastroduodenoscopy, cystoscopy, renoscopy, uteroscopy, laryxbronchoscopy, thoracoscopy, rectokolonoscopy, visual biopsy), ultrasound (U.S.), magnetic resonance imaging (MRI) features cardiography, phonocardiography and radiological studies. Peculiarities of non-communicable diseases of organs and body systems and general principles of surgery in different species of exotic and wild animals.

**Infectious diseases of exotic and wild animals.** The discipline studies the most common dangerous general and specific for each type of animal diseases of viral, bacterial, and fungal origin and neglected diseases that threaten livestock in general.

**Parasitic diseases of wild and exotic animals.** Discipline introduces undergraduates from diseases that are caused by worms, mites, insects, especially their distribution, clinical manifestation in different species of exotic and wild animals, and measures to combat them.

**2.2.11. Master's program "Veterinary support of pisciculture"**

**Hygiene and Sanitation in fish farming.** The study involves the development of students' discipline of modern techniques, methods and techniques of veterinary and sanitary requirements for breeding, cultivating, maintaining and gain that fish in ponds, lakes, rivers, reservoirs and estuaries, as well as artificial water bodies, the organization of veterinary reliable quality control water, feed and feed additives and protection of water bodies from toxic pollutants, the use of modern means of disinfection and decontamination

and desinvasion of fishery ponds, compliance with veterinary and sanitary measures to protect public health against diseases common to man and animals.

**Diseases of fish.** Discipline shaping students' knowledge of complex etiology, pathogenesis and methods of prevention and treatment of infectious and parasitic diseases of freshwater and marine fish and other aquaculture facilities through the use of various drugs, disinfectants, improve water quality, aquatic immune prophylaxis and acclimatization. Special attention is paid to the diagnosis and prevention of non-communicable diseases freshwater fish related to changes in gas composition and hydrochemical regime of water, metabolic disorders, negative impact on the body of xenobiotics, heavy metals, radionuclides, sewage livestock enterprises.

**Hygiene and Sanitation fish processing companies.** Discipline provides knowledge to provide veterinary hygiene and sanitation requirements for basic technological processes of fish and other aquatic organisms and aquatic plants in fish processing plants for frozen fish and seafood, canning, smoked, dried, drying and pickling fish, making preparations. The questions on the use of different disinfectants, schemes and methods of disinfection for storage and processing of fish and seafood, as specified risks reducing the quality of aquaculture products processing facilities, discusses how to prevent poisoning of people substandard food processing.

**Aquaculture.** Discipline examines organizational structure ponds and industrial farms use biological basis of complex measures of intensification of aquaculture aimed at increasing biological productivity and fish productivity of ponds and technology for seed cultivation facilities, production of planting material and commercial fish in the warm-water and cold-water ponds and industrial aquaculture with regard systems, forms and cycles of fisheries management.

#### ***2.2.12. Master's program "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.

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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.

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

#### **2.2.1. Master's program "Physiology of higher nervous activity of animals"**

**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.

**The pathophysiology of higher nervous activity.** Discipline studying disorders of the nervous activity at different levels, pathological changes of mobility of nervous processes, forms of abuse of higher nervous activity, the initial functional state of the cerebral cortex of the brain that leads to neurosis, changes in the functional state of higher central nervous system effects of certain biological factors (starvation, age-related changes), endocrine-autonomic (hyper-, hypo thyroid, gonads, the impact of "pituitary-adrenal"), environmental factors (poisoning, toxicity, infection), induction inhibition of pathological processes, the role of the brain in systemic change orientation pathological processes.

**Pharmacodynamics and pharmacokinetics of drugs.** Discipline considering the mechanism of action of drugs on the central and peripheral nervous system of animals based on typological characteristics of higher nervous activity in order to regulate basic cortical processes in the intact organism.

**Histology of the nervous and endocrine systems.** Discipline is studying the development, structure and histophysiology nerve fibers, micro-and ultra microstructure and myelin free fibers, the general characteristics of endocrine organs and their classification, division into central and peripheral endocrine organs, development, structure and function of neurosecretory nuclei of the hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal glands, and interrenal, suprarenal system dissociated endocrine system, the relationship of the endocrine and nervous systems.

### ***2.2.2. Master's program "Cellular technology in veterinary medicine and biology"***

**Clinical animal pathophysiology.** Discipline provides in-depth knowledge of the pathogenesis of common pathological processes and morphological disorders of organs and systems. Clinical aspects of treatment of pathogenic changes and their significance in the diagnosis of disease and strategies pathogenetic treatment of animals.

**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.

**Molecular mechanisms of cellular and humoral immunity in animals.** It studies the molecular mechanisms of immune responses based on the latest achievements of molecular biology and immunochemistry methods assess the immune status of the body; factors and mechanisms of cell (transplant) and humoral immunity in animals; the theoretical aspects of the formation, regulation and implementation of the immune responses in animals and practice of immunoassay in the laboratory diagnosis of diseases and major disturbances of the immune system of animals with the evaluation of the results based on modern achievements of domestic and foreign immunology; application for research and to produce genetically engineered immune recombinant DNA, monoclonal antibodies; biological properties of the preparation and use in the practice of alpha, beta and gamma interferons, synthetic antigens, various modern vaccine preparations.

### ***2.2.3. Master's program "Biomorfology and plastynation of vertebrates"***

**Anatomical museum appliances.** The purpose of discipline is to develop future researchers deep theoretical knowledge and practical skills of making and preserving anatomical specimens with systems of vertebrates and to create educational and scientific base, as well as making original aesthetic museum exhibits.

**Evolutionary biomorfology of vertebrates.** The purpose of discipline is to develop deep theoretical knowledge and practical skills in preparation of various systems and organs of different classes of vertebrates, as well as methods of comparative anatomical

and functional studies, making it possible to find general relations of the organization by examining the similarities, analogies and transformation of bodies and their systems.

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

**Training of masters of sciences  
branch of knowledge "VETERINARY MEDICINE"  
in specialty 212 "VETERINARY HYGIENE, SANITARY AND EXPERTISE"  
in educational program "VETERINARY HYGIENE, SANITARY AND EXPERTISE"**

Form of training:	Licensed number of persons:
– full-time	75
Duration of training:	
– full-time educational and professional programs	6 years
Credits ECTS:	
– educational and professional programs	360
Language of teaching	Ukrainian
Qualification	doctor of veterinary medicine on safety and quality of agricultural and food products

**The concept of training**

Provides training of highly qualified specialists in the field of veterinary hygiene, sanitary and expertise; formulation of ability by veterinary and sanitary doctor to apply learning outcomes (knowledge, skills, experience) to control sanitation facilities at all stages of animals' breeding, rearing, exploitation, and the production, processing, transportation, inspection, storage and retail of food, feed, feed additives, premixes, reproductive material, veterinary pharmaceuticals, veterinary medication and by-products; apply legal monitoring, including safety and some quality indicators, maintaining good production practices and auditing of food safety management.

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

***Master's program "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.

***Master's program "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 ( "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.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	Credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Veterinary Deontology and ecological Sanitation	1,2	210	7
2	Inorganic Chemistry	1	120	4
3	Physics with the Basics Qualimetry	1	120	4
4	Latin Language	1	120	4
5	Organic Chemistry	2	120	4
6	Animal Genetics and Breeding	2	120	4
7	Zoology	1	90	3
8	Anatomy of animals	1,2,3	240	8
9	Cytology, Histology, Embryology	2,3	210	7
10	Ecotrophology	3	120	4
11	Biochemistry of Animals with the Fundamentals of Physical and Colloidal Chemistry	3,4	180	6
12	Animal Physiology	3,4	180	6
13	Animal Nutrition	4	120	4
14	Veterinary Immunology	4	120	4
15	Sanitary Microbiology	3	150	5
16	Sanitary Virology	4	150	5
17	Animal Hygiene	5,6	210	7
18	Veterinary Sanitary	6,7	150	5
19	Pathological Physiology	5,6	180	6
20	Animal Ethology and Welfare	5,6	180	6
21	Veterinary Clinical Diagnostic	5,6	180	6
22	Veterinary Pharmacology	5	120	4
23	Pathological Morphology	7,8	270	9
24	Parasitology and Invasive Diseases	7,8	180	6
25	Veterinary Radiology	3	120	4
26	Food Safety and Quality	6,7	240	8
27	Veterinary Obstetrics, Gynecology and Andrology	7,8	180	6
28	Veterinary Toxicology	9	120	4
29	General and Special Surgery	5,6	240	8
30	Food Hygiene	8,9,10	330	11
31	Animal Internal Diseases	9,10	240	8
32	Epizootology and Infectious Diseases	7,8	270	9
33	Veterinary and Sanitary Inspection	10	180	6
34	Commodity Science and Standardization	4	150	5
35	Methods of Sanitary Investigation	9	150	5

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	Credits ECTS
<b>Total for standard part</b>			<b>6060</b>	<b>202</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	History of Ukrainian nationhood	1	120	4
2	Etnoculturology	3	120	4
3	Ukrainian Language for Professional Purposes	1	120	4
4	Philosophy	2	120	4
5	Foreign Language	1,2	150	5
6	Physical Education	1,2,3,4		
7	Agricultural policy	4	120	4
8	Basics of Life Safety	5	90	3
9	Methodology and organization of scientific research on the basics of intellectual property	10	120	4
10	Business Foreign Language	10	120	4
11	Personal legal culture	10	90	3
<b>Total (Disciplines offered by University)</b>			<b>1170</b>	<b>39</b>
<b>2.2. Disciplines offered by students</b>				
1	Hygiene of Animal's Transport	5	120	4
2	Food Laboratory Analysis	5	120	4
3	Feed Nutricevtics	6	120	4
4	Biosafety and Biosecurity	6	120	4
5	Food Safety	7	120	4
6	Water Hygiene and Supply	7	120	4
7	Veterinary and Sanitary Forensic	8	120	4
8	Hygiene of Processing Enterprises	8	120	4
9	Animal By-Products Sanitary	9	120	4
10	Game Hygiene	9	120	4
11	Official Audit	10	120	4
12	Hygiene of the Facilities Design	10	120	4
<b>2.2.1. Master's program "State control of objects of sanitary measures"</b>				
1	State Control of Foodstuffs	11,12	420	14
2	Food Monitoring	11,12	360	12
3	Food Risk Analysis	12	360	12
4	Animal Performance Management	12	360	12
<b>Total</b>			<b>1500</b>	<b>50</b>
<b>2.2.2. Master's program "Animal health and welfare"</b>				
1	Animal Performance Management	11,12	360	12
2	International Standards of Animal Maintenance and Exploitation	11,12	360	12
3	BAS Technology	12	360	12
4	State Control of Foodstuffs	12	420	14
<b>Total</b>			<b>1500</b>	<b>50</b>
<b>3. OTHER TYPES OF STUDIES</b>				
1	Educational practice	2,4,6,8,10	570	19
2	Production practice	10,12	420	14
3	Preparation and defense of master's work	12	90	3
<b>Total (Disciplines offered by students)</b>			<b>2220</b>	<b>74</b>
<b>Total for educational program</b>			<b>10800</b>	<b>360</b>

## Annotations educational plan disciplines

### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**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.

**Animal Genetics and Breeding.** Cytological and molecular basis of heredity and variation, the essence of the chromosome theory of inheritance, the structure of genes and their functions, the essence of heredity genetic code, laws of inheritance, the essence of inbreeding and heterosis, genetic basis of individual animals, biological characteristics of different species, patterns of growth and development at different ages, the constitution and the exterior, interior, methods of breeding, selection, selection, assess the quality sires offspring, the impact of selection on the livelihoods and health, the effects of inbreeding and heterosis.

**Zoology.** Species composition, distribution, individual growth, body structure, reproduction, habits and distribution of protozoa, coelenterates, flat, round worms, mollusks, arthropods and chordates.

**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

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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.

**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.

**Sanitary Virology.** Viruses systematics and structure; methods of reproduction and cultivation of viruses; pathogenesis of viral diseases of animals; peculiarities of antiviral immunity, means and methods of diagnostics and prevention of viral diseases of animals.

**Animal Hygiene.** The theoretical basis of the mechanism of environmental factors influence on animals, rules and regulations of zoohygienic maintenance, feeding, breeding of animals of various species, sex, age and production groups, methods of the investigation of objects of the environment and ways of its correction.

**Veterinary Sanitary.** Means and methods of facilities sanitation, methods of monitoring its effectiveness, how to prevent the spread of infectious and parasitic diseases, the development strategy of safe, sanitary safe animal management.

**Pathological Physiology.** Basic common pathological processes in animals, their 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

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species, gender and age in natural and artificial conditions, assessment and forecast the impact on animals of maintenance, transportation technologies, exploitation, feed and care.

**Veterinary Clinical Diagnostic.** Methods of animals' treatment; methods of clinical investigation of animals, including physical, instrumental and laboratory; plan and sequence of clinical animals' research; Methods of clinical examination of farm animals; Methods of fixing animals; professional ethics and deontology.

**Veterinary Pharmacology.** Terminology, chemical structure and composition of drug forms, its' physical and chemical properties, ways of absorption, distribution, biotransformation, excretion; mechanism of action at all levels, from the molecule to the cell to the organ to the whole animal, infectious agent; recommended prescriptions and limitations of use; therapeutic doses for different animal species; most rational drug forms; methods of writing prescriptions, toxicity and adverse negative effect; treatments for poisoning in case of overdose.

**Pathological Morphology.** Fundamentals of pathological processes (disorders of blood circulation and lymph flow, tissue fluid metabolism, degeneration, necrosis, atrophy, hypertrophy, hyperplasia, inflammation, tumors, immunopathological processes), pathology of various organs, nosology, pathomorphological changes and differential signs of major transmissible and non- transmissible diseases, identification and description of the nature of pathological processes in organs and tissues, its macro- and microscopic changes, provision of pathological-anatomical diagnosis, histological technics and its analyses.

**Parasitology and Invasive Diseases.** Parasitic diseases pathogens, their distribution, cycles of development, pathogenesis, symptoms, pathological changes in the body, diagnosis, treatment, prevention and recovery measures in the farms and territories.

**Veterinary Radiology.** Classification of ionizing radiation and its effect on the animals, feed, water and soil, food quality and safety, assessment of its impact on animals and food safety.

**Food Safety and Quality.** The criteria of food quality and safety. Ways and sources of harmful substances intake, mechanism of its destructive influences and means of resistance. Theoretical and methodological principles of food safety. Overview of selected quality and safety indicators.

**Veterinary Obstetrics, Gynecology and Andrology.** Morphological and physiological basis of animal reproduction, methods of semen analyses and evaluation, preservation and transportation of semen; specifics of the estrous cycle in farm and companion animals, the technique of artificial insemination of females; physiological characteristics and pathology of pregnancy, parturition and the post-partum period; obstetrical procedures and criteria for diagnosis, the basic principles of animal care during gestation and around parturition; disease, breast cancer, male genital diseases. disease of the newborn; characteristics of gynecological and andrological animals' examination.

**Veterinary Toxicology.** The main parameters of toxic substances measuring; Classification of pesticides by the function and toxicity parameters; physical and chemical properties of toxic substances and ways of their intake by animals and toxicokinetics; mechanism of toxic effects of toxic substances on animals; clinical signs and typical pathological and anatomical changes poisoned animals; rules of feed and pathological material sampling for chemical and toxicological studies; basic principles of diagnosis of animals poisoning; general and special treatment (antidote); rules of veterinary expertise in the case of animals' poisoning.

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**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 antiepizootic 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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by 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.

## 2.2. Disciplines offered by students

**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

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sampling and investigation of food and assessment.

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

### ***2.2.1. Master's program "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 ojects 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;

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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.

**2.2.2. Master's program "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.

**FACULTY OF ALIMENTARY TECHNOLOGIES AND MANAGING OF QUALITY OF PRODUCTS 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 181 "Alimentary technologies"**

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

The chair responsible for training of bachelors by specialty:

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

phone: (044) 527- 88-85

E-mail: slob2210@ukr.net

Chief of the chair – doctor of biological sciences, professor Derevianko Liudmila Petrivna

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

The chair responsible for training of bachelors by specialty:

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

phone: (044) 527- 88-85

E-mail: slob2210@ukr.net

Chief of the chair – doctor of biological sciences, professor Derevianko Liudmila Petrivna

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

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

The chair responsible for training of masters of sciences by specialty

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

Phone: (044) 527-82-78

E-mail: standardization@ukr.net

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

**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.

***Master's program "Technology of meat and meat products"***

The program is directed on giving magisters the knowledge on theory and practical skill in solving of problems that arise in realization of advanced technologies of storage, preservation and reprocessing of meat, as well as adaptation of norms of quality of raw materials and finished products used in modern manufactures to those that are obligatory in global and European practice.

### **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.

#### ***Master's program "Technology of foodstuffs"***

This is the leading master's program of training by educational program of "Technologies of storage, preserving and reprocessing of meat". Being taught by this program, specialists obtain the basic professional knowledge and skill of work in spheres of manufacturing, development of technologies, organization and management of operation of the enterprise, commercial and marketing problems of manufacture, carrying out of R&D works, as well as in accomplishing of other type activities of enterprises of catering services of various forms of property.

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

The graduates of this specialty have to work at positions of professional specialists (of lower, median and upper rank) in trade enterprises, restaurants, servicing shops (including their structural departments) of various size, forms of property, and organizational and legal forms of business operation, as well as in organizations engaged in external economic relations etc. the graduates may work also in marketing firms, information and computing centers, projecting organizations, occupancy centers, consulting firms, trusts, investing and insurance companies.

### **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 "Globynskii meat-processing complex, Poltava region, TOV "Cheras'ka food-producing copany" Cherkasy region, ZAT "Koziatynskii meat-processing complex", TOV "Gaisynskii meat-processing complex", Vinnitsa region, TOV "Chernihivskii meat-processing complex".

**Tentative themes of master’s diplomas**

1. Optimization of technology of products made of meat of poultry in use of multicomponent brines at TOV “Cherkas’ka food-producing company”, city of Cherkasy.
2. Development of technology of meat products enriched by vegetable masses at TOV “Globynskii meat-processing complex”, Poltava region.
3. Use of zoic albuminous preparations in technology of meat products at TOV “Polis”, Kyiv region.
4. Optimization of technology of boiled and smoked porcine products at TOV “Agrotekhspilka”, Kyiv region.
5. Investigation of influence of enzyme preparations on structural characteristics of semi-finished natural products at PAT “Koziatyns’kii meat-processing complex”, Vinnitsa province.
6. Optimization of technology of porcine products made in use of multicomponent brines at PAT “Koziatyns’kii meat-processing complex”, Vinnitsa province.
7. Effectiveness of use of vegetative extracts in technology of pastes at PAT “Koziatyns’kii meat-processing complex”, Vinnitsa province.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational program "Technologies of Storage, Preserving  
and Reprocessing of Meat"  
(educational and professional program of master’s training)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. OBLIGATORY TRAINING DISCIPLINES</b>				
1	Modern methods of investigation used in the branch-industry	2	120	4
2	Protection of labor in the branch-industry	1	180	6
3	Actual problems of the branch-industry	1	300	10
4	Technology of preservation and reprocessing of meat	2	300	10
5	Biologically active substances produced of raw materials of zoic origin	3	120	4
6	Exploitation of technological equipment	2	150	5
7	Technologies character by economic spending of resources	3	120	4
<b>Total for standard part</b>			<b>1290</b>	<b>43</b>
<b>2. SELECTIVE TRAINING DISCIPLINES</b>				
<b>2.1. Disciplines studied by choose of the University</b>				
1	Businesslike foreign language	1	150	5
2	Agricultural policy	3	90	3
3	Philosophy of science and innovation development	1	90	3

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines studied by choose of students</b>				
<b>2.2.1. Master's program "Technology of meat and meat products"</b>				
1	Psychology of management	3	90	3
2	Optimization of processes of manufacturing	2	90	3
3	Technology of forages for domestic animals	3	150	5
4	Microstructural analysis of meat and meat products	1	120	4
5	International and regional standardization and certification	1	90	3
6	Supply of the branch-industry enterprises by heat	3	90	3
<b>Total (Disciplines offered by students)</b>			<b>660</b>	<b>22</b>
<b>Total for elective part</b>			<b>990</b>	<b>33</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical training		180	6
2	Preparation of diploma and protection of the master's degree		240	8
<b>Total</b>			<b>420</b>	<b>14</b>
<b>Total by educational program</b>			<b>2700</b>	<b>90</b>

### Annotations of training disciplines

#### 1. OBLIGATORY TRAINING DISCIPLINES

**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.

**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.

**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.

**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.

## 2. SELECTIVE TRAINING DISCIPLINES

### 2.1. Disciplines studied by choose of the University

**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.

**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.

## 2.2. Disciplines studied by choose of students

### 2.2.1. Master's program "*Techniology of meat and meat products*"

**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.

**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.

**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.

**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.

**Supply of the branch-industry enterprises by heat.** The program of training presumes studying of theoretical fundamentals of thermodynamics, theory of thermoexchange, rational use of resources of heat and energy in observance of norms of protection of surrounding nature.

**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.

***Master's program "Technology of storage, preservation and reprocessing of fish and seafood"***

The program is directed on giving magisters the knowledge on theory and practical skill in solving of problems that arise in realization of advanced technologies of storage, preservation and reprocessing of fish and seafood, as well as adaptation of norms of quality of raw materials and finished products used in modern manufactures to those that are obligatory in global and European practice.

**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.

### **Tentative themes of master’s diplomas**

1. Optimization of technology of salting of fish raw materials in use of method of injecting at the fish-processing plant of “Rybkoopprodukt”, Kyiv region.
2. Technology of structured paste products realized in use of pikowave treatment.
3. Optimization of technology of preserves of aquatic backboneless organisms in use of method of preliminary thermal treatment at TOV “Olvana”, Kyiv region.
4. Optimization of technology of canned fish for childrens nutrition at VAT “Odes’kii konservnyi zavod dytiachogo kharchuvannia”, city of Odesa.
5. Use of untraditional raw materials of smoking of fish in technology of pastes produced of fish raw materials.
6. Optimization of technology of smoking of fish in use of extracts of medicinal plants.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. OBLIGATORY TRAINING DISCIPLINES</b>				
1	Modern methods of investigation used in the branch-industry	2	120	4
2	Protection of labor in the branch-industry	3	180	6
3	Actual problems of the branch-industry	1	300	10
4	Modern technologies of storage and preservation of fish products	2	300	10
5	Technology of albuminous products produced of fish and seafood	3	120	4
6	Exploitation of technological equipment	2	150	5
7	Technologies character by economic spending of resources	3	120	4
<b>Total for standard part</b>			<b>1290</b>	<b>43</b>
<b>2. SELECTIVE TRAINING DISCIPLINES</b>				
<b>2.1. Disciplines studied by choose of the University</b>				
1	Businesslike foreign language	1	150	5
2	Agricultural policy	3	90	3
3	Philosophy of science and innovative development	1	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines studied by choose of students</b>				
<b>2.2.1. Master's program "Technology of storage, preservation and reprocessing of fish and seafoods"</b>				
1	Microstructural analysis of fish and seafoods	3	90	3
2	Optimization of processes of manufacturing	2	90	3
3	Psychology of management	1	90	3
4	Biologically active substances produced of fish and seafood	1	120	4
5	International and regional standardization and certification	1	90	3
6	Technology of fabrication of fish powder	3	150	5
<b>Total (Disciplines offered by students)</b>			<b>690</b>	<b>23</b>
<b>Total for elective part</b>			<b>1020</b>	<b>34</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical training		150	5
2	Preparation of diploma and protection of the master's degree		240	8
<b>Total</b>			<b>390</b>	<b>13</b>
<b>Total by educational program</b>			<b>2700</b>	<b>90</b>

**Annotation of training disciplines**

**1. OBLIGATORY TRAINING DISCIPLINES**

**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.

**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.

**Actual problems of the branch-industry.** The program of training presumes acquainting with the state and perspectives of development of the base of raw materials in freshwater basins of Ukraine and in the world ocean; basic parameters of quality of fish raw materials and methods of preservation of quality of live, cooled and salted fish; procedures of smoking, drying and other methods of preservation of fish and hydrobionts; types of semi-manufactured fish products, culinary fabrics etc.

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

## 2. SELECTIVE TRAINING DISCIPLINES

### 2.1. Disciplines studied by choose of the University

**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.

**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.

## 2.2. Disciplines studied by choose of students

### **2.2.1. Master's program "Technology of storage, preservation and reprocessing of fish and seafoods"**

**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.

**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.

**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.

**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.

**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.

**Technology of fabrication of fish powder.** The discipline presumes studying of methods of producing, storage, use and evaluation of quality of forages produced out of hydrobionts; studying of modern technologies of production used in fish industry domestically and in the world, methods of producing of fish powder, its energetic and biological values, as well as variation of its composition in processes of manufacturing and storage.

**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, 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.

***Master's program "Management of safety and quality of alimentary products"***

The program has the purpose of training of specialists who would have the fundamental knowledge in spheres of managing of safety and quality of foodstuffs, especially by documents of technical and legal character that regulate norms of safety and quality of foods in Ukraine, European Union and internationally; systems of managing of safety of foodstuffs; systems of managing of quality of foodstuffs; system of monitoring of indices of quality and safety of foods.

**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 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 asociatsiji 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 “Malyns’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 “Koziatyns’kii miasokombinat”, Vinnitsa region; TOV “Gaisyns’kii viasokombinat” Vinnitsa region and others.

### **Tentative themes of master’s diplomas**

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 khlipoprodukt”.
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.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. OBLIGATORY TRAINING DISCIPLINES</b>				
1	Economical aspects of entrepreneurship	3	90	3
2	Research and innovative processes	2	120	4
3	Systemic approach and methods of taking of decisions	3	120	4
4	International and regional standardization and certification	3	120	4
5	Quality management	1	180	6
6	Standardization	1	120	4
7	Audit and certification	1	120	4
8	Managing of quality and safety of foodstuffs	1,2	300	10
9	Standardization and certification of products of agriculture	2	180	6
<b>Total for standard part</b>			<b>1350</b>	<b>45</b>
<b>2. SELECTIVE TRAINING DISCIPLINES</b>				
<b>2.1. Disciplines studied by choose of the University</b>				
1	Businesslike foreign language	1	150	5
2	Agricultural policy	3	90	3
3	Philosophy of science and innovation development	2	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines studied by choose of students</b>				
<b>2.2.1. Master's program "Management of safety and quality of alimentary products"</b>				
1	Mathematical modeling of systems and processes	3	120	4
2	Methods of ensuring and managing by quality of foodstuffs	3	210	7
3	Management by conditions of environment	2	120	4
4	Management of personnel	2	120	4
5	Psychology of management	1	90	3
<b>Total (Disciplines offered by students)</b>			<b>660</b>	<b>22</b>
<b>Total for elective part</b>			<b>990</b>	<b>33</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical training		180	6
2	Preparation of diploma and protection of the master's degree		180	6
<b>Total</b>			<b>360</b>	<b>12</b>
<b>Total by educational program</b>			<b>2700</b>	<b>90</b>

## Annotation of training disciplines

### 1. OBLIGATORY TRAINING DISCIPLINES

**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.

**Research and innovative processes.** Methods of scientific investigations. Methods of exploration of processes of forming of quality (given services). Types and potential of material means of manufacturing (equipment, auxiliaries, resources) necessary for producing of products (giving of services) of proper quality. Stream of data used in forming of set quality of production (given services). Acquisition and processing of information. analysis and systematization of information. Modeling of processes. Cause-and-effect relations in spheres of quality, standardization and certification. Forecasting of ways of development of system of manufacturing. Analysis of processes of development of system of manufacturing. Analysis of constituents of interest of [personnel. Methods of scientific research.

**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.

**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.

**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 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.

**Standardization.** Standards of the organization (enterprise, institution). Identification of conformity of norms of standard to modern level of development of. Identification of existing level of development of science and technique in the sphere of

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validity of certain standard. Procedures of amendment of clauses of normative documents. technical regulations. Laws used in sphere of standardization. Procedures of abolition of normative documents. information on amending of provisions of normative documents. unification of products and/or services. Standardization of products and/or services. State system of standardization. Control of correctness of norms set by normative documents of the organization (enterprise, institution). Methods of supply of departments of the organization (enterprise, institution) by necessary documentation by standardization, quality management and certification. reports on introduction of norms of standards and activities of all departments of the organization (enterprise, institution) by problems of quality management and certification.

**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.

**Management by quality and safety of products of agriculture and alimentary 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.

**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.

## 2. SELECTIVE TRAINING DISCIPLINES

### 2.1. Disciplines studied by choose of the University

**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.

**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.

## 2.2. Disciplines studied by choose of students

### **2.2.1. Master's program "Management of safety and quality of alimentary products"**

**Mathematical modeling of systems and processes.** This discipline gives students the knowledge, which permits to understand the essence of use of systems of modeling in selection of parameters of carrying out of technological processes and possible methods of calculation of equipment used in the branch-industry and make the deliberate choose of procedures of organization of technological process of fabrication of the foodstuff in question. Studying of this discipline gives future specialists the possibility to substantiate from the scientific viewpoint the correct procedures of operation in guaranteed producing of products of proper quality.

**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.

**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.

**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.

**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.

## FACULTY CONSTRUCTION AND DESIGN

**Dean** – Ph.D. (Technical Sciences), associate professor Zynoviy Ruzhylo  
Tel.: +38 (044) 527-81-29  
E-mail: dekanat\_kd@ukr.net  
Location: building № 11, room 305

The faculty organizes and co-ordinates the educational process of preparing masters for educational programs within specialties:

### **Specialty 133 "Machinery and Agricultural Equipment"**

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

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

##### **Reliability of Machinery**

Tel.: (044) 527-87-71

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

Head – Dr. Sc., Professor Anatoliy Boyko

##### **Tractors, cars and bio energy systems**

Tel.: (044) 527-88-95

E-mail: gagolub@ukr.net

Head of department – Doctor of Technical Sciences, professor Golub Gennady

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

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

##### **Reliability of Machinery**

Tel.: (044) 527-87-71

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

Head of department – Doctor of Technical Sciences, professor Boyko Anatoliy

#### ***Educational program "Technical service of machines and equipment of agroindustrial complex"***

Diploma Departments:

##### **Reliability of Machinery**

Tel.: (044) 527-87-71

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

Head of department – Doctor of Technical Sciences, professor Anatoliy Boyko

**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 Vyacheslav Loveykin

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

***Educational program "Industrial and Civil Engineering"***

Diploma Departments:

**Construction**

Tel.: (044) 527-83-92

E-mail: a.david@ukr.net

Head of department – Doctor of Technical Sciences, professor Davidenko Oleksandr

**Mechanics**

Tel.: (044) 527-83-25

E-mail: berezovyi@nubip.edu.ua

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

**Master's studying  
the field of knowledge "Mechanical Engineering"  
Specialty 133 "MACHINERY AND AGRICULTURAL EQUIPMENT"  
Educational program "MACHINERY AND EQUIPMENT  
OF AGRICULTURAL PRODUCTION"**

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

**Concept of training**

Training of Master's course students in the field "Machines and equipment for agricultural production" is based on a systematic approach to obtain specific skills and knowledge that are sufficient for realization of professional tasks and responsibilities in the field of constructing, designing, testing, certification, maintenance and utilization of machines and equipment for agricultural production.

The specialist gets in-depth 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**

***Master's program "Machinery and equipment of agricultural production"***

A specialist obtains a deep knowledge of design, engineering and testing of machines for agricultural production, based on the theory of technical systems, comprehension of system evaluation methods and methods of equipment testing for agricultural machinery by industrial, national and international standards. Engineering of agricultural machines is implemented through formation, structuring and solution to optimization problems of analysis and synthesis.

**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 activities of primary positions in the group of professions: organizational and managerial activities, pedagogical and research work, in design and research departments of enterprises, research and design institutions.

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

#### ***Master's program "Machinery and equipment of agricultural production"***

The specialist gets deep knowledge about the innovative construction and design of mechatronic systems of agricultural machinery based on classical and modern concepts of mechatronics, mechanical motion control of programmable equipment and digital control theory.

There is a clear understanding of the stages of construction 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-designer" are able to perform professional tasks and responsibilities of an innovative nature, provided in the form of economic activities of primary positions in the group of professions: organizational and managerial activities, pedagogical and research work, in design and research departments of enterprises, research and design institutions.

#### **Practical training**

During practical training the faculty is oriented on close co-operation and collaboration with educational-experimental enterprises of university, such as: 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".

Practical training is also carried out at the advanced research institutions and enterprises of agricultural and forestry such as: National Scientific Centre "Institute of Mechanization and Electrification of Agriculture," L.Pogorelyi's Ukrainian Research Institute of Forecasting and testing of equipment and technologies for agricultural production; Companies "TAN", "John Deere", "Amaco", "Astra"; State Forestry Agencies of forest resources of Ukraine.

#### **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..

#### **Academic rights of applicants**

Graduates can continue their studies:

- 1) on the basis of the acquired OS "Bachelor" from a related specialty (Table 2);
- 2) on the basis of the acquired OS "Bachelor" from an unrelated specialty (with the addition of additional entrance examination) (Table 3);

3) on the basis of the acquired OS "Bachelor" from any specialty (without compiling additional entrance examinations) in accordance with the list of specialties of the Rules of admission to NUBiP of Ukraine in 2018;

4) by parallel studying on the day-time form of studies in the related specialty (see item 1) and on correspondence form of study (see item 2, paragraph 3);

5) by way of parallel training in full-time education (see paragraph 2, para. 3) and part-time education on correspondence form of study in a related specialty (see item 1).

**Curriculum training level "Master"  
of educational program "Machinery and equipment of agricultural production"  
(educational-professional program)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Mechanics of technical systems constructions	1	150	5
2	Reliability of technical systems	2	120	4
3	Computer aided design systems	1	150	5
4	Energy-ecological assessment of the design of machines	1,2	150	5
5	Mechatronics	1,2	180	6
6	Testing of agricultural technique	2	120	4
7	Theory of technical systems	2	150	5
<b>Total</b>			<b>1020</b>	<b>34</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Applied computer technologies	2	150	5
2	Fundamentals of scientific research	1	180	6
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Machines and equipment of agricultural production"</b>				
1	Design of vibration machines	2	90	3
2	Design of machines and equipment in animal husbandry	2	90	3
3	Design of machines and equipment in bioenergetics	2	90	3
4	Reliability of agricultural machines	1	150	5
5	Economics of technological systems	2	120	4
6	Methods of designing working bodies of agricultural machinery	1	150	5
<b>Total (Disciplines offered by students)</b>			<b>690</b>	<b>23</b>
<b>Total for elective part</b>			<b>1020</b>	<b>34</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical trainings		480	16
2	Preparation and defense of master's work		180	6
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Curriculum training level "Master"  
of educational program " Machinery and equipment of agricultural production"  
(educational and scientific program)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Mechanics of technical systems constructions	1	150	5
2	Reliability of technical systems	2	120	4

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
3	Computer aided design systems	2	150	5
4	Енергоекологічна оцінка конструкції машин	1,2	150	5
5	Mechatronics	1,2	180	6
6	Testing of agricultural technique	2	120	4
7	Theory of technical systems	2	150	5
8	Dynamics and optimization of machines	4	90	3
9	Theory and methodology of scientific research	4	90	3
10	Economics of technical systems	4	120	4
11	Industrial nanomaterials and nanotechnology in technic	4	90	3
<b>Total</b>			<b>1410</b>	<b>47</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Applied computer technologies	2	150	5
2	Fundamentals of scientific research	1	180	6
3	Technical support of biotechnological processes	4	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>14</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Machines and equipment of agricultural production"</b>				
1	Design of vibration machines	2	90	3
2	Design of machines and equipment in animal husbandry	2	90	3
3	Design of machines and equipment in bioenergetics	2	90	3
4	Reliability of agricultural machines	1	150	5
5	Economics of technological systems	2	120	4
6	Methods of designing working bodies of agricultural machinery	1	150	5
7	Theory of mechatronic systems of agricultural machines	4	90	3
8	Theoretical and experimental modeling of machine units	4	90	3
9	Biomechanics	4	90	3
<b>Total (Disciplines offered by students)</b>			<b>960</b>	<b>32</b>
<b>Total for elective part</b>			<b>1290</b>	<b>45</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical trainings		630	21
2	Preparation and defense of master's work		180	6
<b>Total</b>			<b>810</b>	<b>27</b>
<b>Total for educational program</b>			<b>3600</b>	<b>120</b>

### Abstract disciplines curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**Mechanics of technical systems constructions.** The discipline studies the phenomena that affect the operability of technical systems considering the constructive and technological methods of improving structures machines, in terms of energy intensity, metal, etc.; provides a theoretical justification for the required accuracy of elements of structures of technical systems and methods for achieving it..

**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.

**Computer aided design systems.** Discipline involves raising a comprehensive theoretical and practical professional skills of future engineers-designers by familiarizing them with contemporary CAD various classes, the mastery of the necessary techniques and skills of implementation of development activities using major CAD systems.

**Energy-ecological assessment of the design of machines.** In this discipline, methods and methods of calculation and designing at all stages of the development of technical means, schemes of construction and functioning of objects of modern new technology for agriculture are studied.

**Mechatronics.** Course of this subject aims to familiarize with the basic provisions and directions of use of mechatronics, which studies patterns, computer-controlled machine and functions and structures equipment and software management.

**Testing of agricultural technique.** Course in the discipline aimed to study engineering test methods for agricultural technology, which allows getting an objective assessment of the design, technological and service properties of equipment and determining their compliance with technical requirements and current technological requirements on workflows.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**Applied computer technologies.** The study of this discipline can improve the applied theoretical and practical professional skills of future Master's engineers by their knowledge of modern computer technology in various technological systems, learning features and methods of use, mastering the necessary techniques and practical skills with computer applications for production purposes of Agricultural Engineering.

**Fundamentals of scientific research.** Discipline studying the General situation of scientific activity, in particular the concept of method and methodology and their role in scientific cognition, stages of research work, organization of experiment, the fundamentals of inventive work, in particular the preparation of the application for the invention, and methods of statistical processing of experimental data.

### 2.2. Disciplines offered by students

#### Educational-professional program

##### *2.2.1. Master's program "Machines and equipment of agricultural production"*

**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.

**Methods of designing working bodies of agricultural machinery.** The discipline course is aimed to study of existing methods of constructing of agricultural workers 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 obtain maximum benefits are studied. Audit and practical classes on discipline envisage students mastering the economic bases of production in the conditions of agro-industrial enterprises.

### Educational and scientific program

#### 2.2.1. *Master's program "Machines and equipment of agricultural production"*

**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 obtain maximum benefits are studied. Audit and practical classes on discipline envisage students mastering the economic bases of production in the conditions of agro-industrial enterprises.

**Methods of designing working bodies of agricultural machinery.** The discipline course is aimed to study of existing methods of constructing of agricultural workers 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.

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**Theory of mechatronic systems of agricultural machines.** The discipline studies the theoretical basics of construction of mechatronic systems, methods of their control and automatic means of implementation of mechatronic systems in agricultural machines.

**Theoretical and experimental modeling of machine units.** This is a complex discipline that studies the methods and ways to model objects that interact with each other and the environment to predict the response object to control the impacts analysis of its sensitivity to various factors while maintaining adequate mathematical description of the physical real object.

**Biomechanics.** The course of this discipline is aimed at familiarization with the basic provisions and uses biomechanics as the prototype structure of the machine unit.

**Master's studying  
the field of knowledge "Mechanical Engineering"  
Specialty 133 "MACHINERY AND AGRICULTURAL EQUIPMENT"  
Education program "FOREST COMPLEX EQUIPMENT"**

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

**Concept of training**

Training of Master-students within the program "Machinery for forest complex" is based on a systematic approach to obtain specific skills and knowledge that are sufficient for realization of professional tasks and responsibilities in the area of machine constructing, designing, testing, certification, maintenance and utilization of machines and equipment for forestry.

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 assessment and testing methods of forestry equipment in accordance with sectoral, national and international standards.

There is a clear understanding of the design of forestry equipment as a complex mechanical system. An assessment of the quality of repaired and non-repaired systems is carried out, and their reliability is assured.

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

***Master's program "Forest complex equipment"***

A specialist obtains a deep knowledge of design, engineering and testing of machines for forest complex, based on the theory of technical systems, comprehension of system evaluation methods and methods of equipment testing for the forest complex by industrial, national and international standards.

It is assumed a clear comprehension to constructing machines for forestry as a part of the mechanical system. It is assessed as repairable and non-repairable systems and ensuring their reliability.

**Occupation of graduates**

Graduates with diploma of Engineer-Mechanic are able to implement professional tasks and responsibilities provided in the form of engineering activity of positions in various groups of profession related to engineering, organization of production and management, teaching and researching in engineering departments of research institutions.

**Practical training**

During practical training the faculty is oriented on close co-operation and collaboration with educational-experimental enterprises of university, such as: 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”.

Practical training is also carried out at the advanced research institutions and enterprises of agricultural and forestry such as: National Scientific Centre "Institute of Mechanization and Electrification of Agriculture," L.Pogorelyi’s Ukrainian Research Institute of Forecasting and testing of equipment and technologies for agricultural production; Companies “TAN”, “John Deere”, “Amaco”, “Astra”; State Forestry Agencies of forest resources of Ukraine.

### Examples of Master’s Thesis Subjects

1. Justification of the structural parameters of the chipper of wood materials.
2. Investigation of 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 the technical condition and development of the technological process of repairing wood shavers.

### Academic rights of applicants

Graduates can continue their studies:

- 1) on the basis of the acquired OS "Bachelor" from a related specialty (Table 2);
- 2) on the basis of the acquired OS "Bachelor" from an unrelated specialty (with the addition of additional entrance examination) (Table 3);
- 3) on the basis of the acquired OS "Bachelor" from any specialty (without compiling additional entrance examinations) in accordance with the list of specialties of the Rules of admission to NUBiP of Ukraine in 2018;
- 4) by parallel studying on the day-time form of studies in the related specialty (see item 1) and on correspondence form of study (see item 2, paragraph 3);
- 5) by way of parallel training in full-time education (see paragraph 2, para. 3) and part-time education on correspondence form of study in a related specialty (see item 1).

### Curriculum training level "Master" of educational program "Forest complex equipment" (educational-professional program)

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Systems of automated design for forest complex equipment	2	150	5
2	Reliability of technical systems of forest complex equipment	2	120	4
3	Energy-ecological assessment of the equipment of the forest complex	1,2	180	6
4	Mechatronic systems of machines for forestry	1,2	240	8
5	Reliability of machines for forestry	1	180	6
6	Dynamics of machines for forestry	2	150	5
<b>Total</b>			<b>1020</b>	<b>34</b>

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Applied computer technologies of machines for forestry	2	150	5
2	Fundamentals of scientific research	1	180	6
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Forest complex equipment"</b>				
1	Designing of technical systems for forestry	2	90	3
2	Methods of designing machines for forestry	1	150	5
3	Theory and designing of vehicles for forestry	1	120	4
4	Testing of machines for forestry	2	120	4
5	Design of vibration machines for forestry	2	90	3
6	Economics of technological systems	2	120	4
<b>Total</b>			<b>690</b>	<b>23</b>
<b>Total (Disciplines offered by students)</b>			<b>1020</b>	<b>34</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical trainings		480	16
2	Preparation and defense of master's work		180	6
<b>Total</b>			<b>660</b>	<b>22</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Abstract disciplines curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**Systems of automated design of forest complex equipment.** The discipline involves raising the general theoretical and practical professional level of future engineers of mechanics through their familiarization with modern systems of automated designing of different classes, assimilation of functional capabilities and methods of use, mastering the necessary techniques and practical skills in designing forestry equipment.

**Reliability of technical systems of forest complex equipment.** 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; theory of graphs; logic-simulation model for reliability testing of technical systems; methods of ensuring the reliability of technical systems of forest equipment equipment.

**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.

**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 loadings and recommendations and ways to reduce these loadings during work.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.** Discipline studying the General situation of scientific activity, in particular the concept of method and methodology and their role in scientific cognition, stages of research work, organization of experiment, the fundamentals of inventive work, in particular the preparation of the application for the invention, and methods of statistical processing of experimental data.

### 2.2. Disciplines offered by students

#### Educational-professional program

##### *2.2.1. Master's program "Forest complex equipment"*

**Methods of designing machines for forestry.** Course of this discipline is directed at the existing knowledge about design techniques of forestry equipment; to learn the functional possibilities to use them; to get the necessary techniques and practical skills to implement design methods for production purposes in machines for forestry..

**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.

**Design of vibration machines for forestry.** 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 obtain maximum benefits. Audit and practical classes on discipline envisage students mastering the economic bases of production in the conditions of agro-industrial enterprises.

**Master's studying  
the field of knowledge "Mechanical Engineering"  
Specialty 133 "MACHINERY AND AGRICULTURAL EQUIPMENT"  
Education program "TECHNICAL SERVICE OF MACHINES AND EQUIPMENT FOR  
AGROINDUSTRIAL COMPLEX"**

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

**Concept of training**

The training of masters in specialty 133 "Machinery and agricultural equipment" 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 nature in the field of design, construction, 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 testing methods in accordance with industry, national and international standards.

A clear understanding of the technical service of machinery and equipment of agroindustrial complex is foreseen. An assessment of the quality of repaired and non-repaired systems is carried out, and their reliability is assured.

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

***Master's program "Technical service of machines and equipment of agroindustrial complex"***

The specialist gets deep knowledge about designing, engineering and testing equipment for agricultural machinery and its maintenance, based on the theory of technical systems, a clear understanding of the stages of system evaluation and testing techniques in accordance with sectoral, national and international standards.

A clear understanding of the technical service of machinery and equipment of agroindustrial complex is foreseen. An assessment of the quality of repaired and non-repaired systems is carried out, and their reliability is assured.

**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 is oriented on close co-operation and collaboration with educational-experimental enterprises of university, such as: 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”.

Practical training is also carried out at the advanced research institutions and enterprises of agricultural and forestry such as: National Scientific Centre "Institute of Mechanization and Electrification of Agriculture," L.Pogorelyi's Ukrainian Research Institute of Forecasting and testing of equipment and technologies for agricultural production; Companies “TAN”, “John Deere”, “Amaco”, “Astra”; State Forestry Agencies of forest resources 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 technology.

### Academic rights of applicants

Graduates can continue their studies:

- 1) on the basis of the acquired OS "Bachelor" from a related specialty (Table 2);
- 2) on the basis of the acquired OS "Bachelor" from an unrelated specialty (with the addition of additional entrance examination) (Table 3);
- 3) on the basis of the acquired OS "Bachelor" from any specialty (without compiling additional entrance examinations) in accordance with the list of specialties of the Rules of admission to NUBiP of Ukraine in 2018;
- 4) by parallel studying on the day-time form of studies in the related specialty (see item 1) and on correspondence form of study (see item 2, paragraph 3);
- 5) by way of parallel training in full-time education (see paragraph 2, para. 3) and part-time education on correspondence form of study in a related specialty (see item 1).

### Curriculum training level "Master" of educational program "Technical service of machines and equipment of agroindustrial complex" (educational-professional program)

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Mechanics of constructions of technical systems of technical service	1	150	5
2	Reliability of technical systems of technical service	2	120	4
3	Systems of automated designing	2	150	5
4	Energy-ecological assessment of the design of the technical service	1,2	150	5

MASTER CURRICULA AND TRAINING PROGRAMS

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
5	Management and logistics of service enterprises	2	210	7
6	Tests of technical service equipment	2	120	4
7	Qualimetry	2	120	4
<b>Total for standard part</b>			<b>1020</b>	<b>34</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Applied computer technologies	2	150	5
2	Fundamentals of scientific research	1	180	6
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Technical service of machines and equipment of agroindustrial complex"</b>				
1	Design of technical enterprises and enterprises of technical service	1,2	180	6
2	Reliability of the technical service equipment	1	210	7
3	Economics of technological systems	2	120	4
4	Methods of designing technical service equipment	1	180	6
<b>Total (Disciplines offered by students)</b>			<b>690</b>	<b>23</b>
<b>Total for elective part</b>			<b>1020</b>	<b>34</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical trainings		480	16
2	Preparation and defense of master's work		180	6
<b>Total</b>			<b>660</b>	<b>22</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Abstract disciplines curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Systems of automated designing.** The discipline involves raising the general theoretical and practical professional level of future engineers of mechanics 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 designing techniques.

**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; 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 the technical service.** In this discipline, methods of calculation and designing at all stages of the development of technical means, schemes of construction and functioning of objects of modern new technology are studied..

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

**Tests of technical service equipment.** The course on this discipline is aimed at studying engineering methods of testing agricultural machinery, which allow to obtain 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 technical service enterprises, calculations of their main parameters, as well as logistic features in the field of technical service.

**Qualimetry.** This discipline examines the existing methods of calculations when conducting technical measurements

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.** Discipline studying the General situation of scientific activity, in particular the concept of method and methodology and their role in scientific cognition, stages of research work, organization of experiment, the fundamentals of inventive work, in particular the preparation of the application for the invention, and methods of statistical processing of experimental data.

### 2.2. Disciplines offered by students

#### Educational-professional program

#### *2.2.1. Master's program "Technical service of machines and equipment of agroindustrial complex"*

**Reliability of the technical service equipment.** This is a complex discipline, which studies: the regularities of changing the technical condition of machines and their elements during operation, methods for eliminating defects and damage, providing the surfaces with details of 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 technical service equipment.** The course on this discipline is aimed at understanding the existing basics of designing the working bodies of agricultural machinery, 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 agricultural machinery.

**Design of technical enterprises and enterprises of technical service.** 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 planning schemes 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 obtain maximum benefits. Audit and practical classes on discipline envisage students mastering the economic bases of production in the conditions of agro-industrial enterprises.

**Master's studying  
the field of knowledge "Building and Architecture"  
Specialty 192 "INDUSTRIAL AND CIVIL CONSTRUCTION"  
Education program "INDUSTRIAL AND CIVIL CONSTRUCTION"**

Type of studying:	Licensed volume of persons:
– full-time studying	25
Duration of studying:	
– full-time studying educational-professional program	1,5 years
Credits ECTS:	
educational-professional program	90
Language	Ukrainian, English
Academic degree	Engineer-Researcher

**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 best world educational programs for work in the public and private sectors of the Ukrainian economy.

The program provides for the execution of works commissioned by strategic partners for the development of innovative projects for industrial and civil construction of agricultural and environmental complexes.

***Master's program "Industrial and civil construction"***

The program provides for the execution of works commissioned by strategic partners for the development of innovative projects for industrial and civil construction of agricultural and environmental 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; design engineer; 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 technic and technology; standardization engineer; design engineer; engineer-researcher.

**Practical training**

Practical training of specialists is carried out in DP Knauf marketing Ukraine, Research Institute "Ukragrobudivnutstvo", research institute "Ukragropromproduktivnist", research institute of construction production, Design and Development Bureau of the Ukrainian Research Institute of Prognostication and Testing of Equipment and Technologies for Agricultural Production named after. Leonid Pogorilly ", Design Bureau of the National Science Center" Institute of Mechanization and Electrification of Agriculture ", LLC" Agrobidside Alliance "Astra", LLC "John Deere of Ukraine", PP "Novitel AgrobudovlinnyeTechnologii", Research Institute of Building Structures, other bases of the practical training of students (listeners) of the university from among the leading institutions, enterprises, organizations in Ukraine and abroad, which have the proper

conditions for carrying out the practice of students 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 agricultural enterprise using effective reinforced concrete slabs.
2. Steel frames made from welded twisted-nets of variable section with a flexible wall.
3. Non-woven and barbed steel reinforced concrete slabs.
4. Technology of increasing / reduction of an automobile overpass of agrarian grain-terminal complex.
5. Fire resistance of steel reinforced concrete slabs.
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.

### Academic rights of applicants

Graduates can continue their studies:

- 1) on the basis of the acquired OS "Bachelor" from a related specialty (Table 2);
- 2) on the basis of the acquired OS "Bachelor" from an unrelated specialty (with the addition of additional entrance examination) (Table 3);
- 3) on the basis of the acquired OS "Bachelor" from any specialty (without compiling additional entrance examinations) in accordance with the list of specialties of the Rules of admission to NUBiP of Ukraine in 2018;
- 4) by parallel studying on the day-time form of studies in the related specialty (see item 1) and on correspondence form of study (see item 2, paragraph 3);
- 5) by way of parallel training in full-time education (see paragraph 2, para. 3) and part-time education on correspondence form of study in a related specialty (see item 1).

### Curriculum training level "Master" of educational program "Industrial and civil construction" (educational-professional program)

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Construction norms of Ukraine (OIF, MK, ZBK)	1	120	4
2	Reconstruction of buildings and structures	2	120	4
3	Basics of system analysis	1	120	4
4	Theory and methodology of scientific research	1	120	4
5	Mechatronic systems in construction	1	120	4
6	Estimated and contractual documentation	2	120	4
7	Engineering protection and preparation of territory (OIF, TBV)	1	120	4
8	CAD in construction	2	180	6
<b>Total for standard part</b>			<b>1230</b>	<b>41</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Innovative engineering and construction technologies in agricultural constructing	2	120	4

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
2	Testing of building structures (OIF, ZBK, MK)	2	210	7
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Industrial and civil construction"</b>				
1	Development of effective building structures (ZBK, MK, OIF)	2	120	4
2	Design of buildings and structures in agricultural construction (ZBK, MK, OIF)	1,2	210	7
3	Legal support of construction	2	120	4
4	Repair and exploitation of buildings and structures	1	120	4
5	Occupational Health	1	120	4
<b>Total (Disciplines offered by students)</b>			<b>690</b>	<b>23</b>
<b>Total for elective part</b>			<b>2250</b>	<b>75</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical trainings		210	7
2	Preparation and defense of master's work		240	8
<b>Total</b>			<b>450</b>	<b>15</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Abstract disciplines curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**Construction norms of Ukraine (OIF, MK, ZBK).** 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 installation processes.

**Reconstruction of buildings and structures.** Obtaining the theoretical knowledge and practical skills that will be needed in practice. Interdependent system of preparation for implementation of certain types of work, establishment and maintenance of general order, priority and terms of work execution, 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 scientific research, teaching and management functions.

**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 concept of experimental research methods.

**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 of realization of mechatronic systems in agricultural construction.

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

**Engineering protection and preparation of territory (OIF, TBV).** Town-planning assessment of the territory by natural factors. Vertical planning of the city territory. Quantitative and qualitative assessment of the relief. Methods of vertical planning. Rainwater drainage system in the system of discharge of surface water. Theoretical foundations of the design of territories in which dangerous physico-geological processes take place. Engineering improvement of rural territories of different purposes. Theoretical foundations of the means of combating transport and industrial noise, gas pollution. Lighting of rural territories. Sanitary facilities. Organization of the collection of surface runoff.

**CAD in construction.** General information about the composition of the working project. Basic kits of drawings of a working project. Composition of drawings of the basic kits of the brand of GP, AR. Use of the computer program "ArchiCAD" for 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 images for better quality. Reproduction and assembly of drawings.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**Testing of building structures (OIF, ZBK, MK).** 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 among themselves; with the basic requirements for structural elements of buildings and the buildings themselves, taking into account the specific conditions of their operation.

**Innovative engineering and construction technologies in agricultural constructing.** To give knowledge about legal, organizational and methodological foundations of definition of concepts about innovative activity and substantiation of innovative engineering technologies in agricultural construction.

### 2.2. Disciplines offered by students

#### Educational-professional program

##### 2.2.1. Master's program "Industrial and civil construction"

**Development of effective building structures (ZBK, MK, OIF).** Theoretical bases of teaching of theoretical bases and principles of development of effective building constructions (ZBK, MK, OIF). methods of their management and automatic means of realization of systems in agricultural construction.

**Design of buildings and structures in agricultural construction (ZBK, MK, OIF).** Theoretical bases of design of buildings and structures of this appointment (ZBK, MK, OIF), methods of their management and automatic means of realization of systems in agricultural construction.

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

**Legal support of construction.** Increasing the general theoretical and practical legal level of future engineers-builders by mastering the foundations of theoretical knowledge and practical skills on the legal issues of construction production.

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

## **FACULTY MECHANIZATION OF AGRICULTURAL**

**Dean** – Associate Professor Yaroslav Mykhaylovich  
Tel.: (044) 527-85-34  
E-mail: mtf11k@ukr.net  
Location: educational building № 11, room 309

Mechanical Engineering Department organizes and coordinates the educational process of preparation of masters in the field:

### **Specialty 275 "Transport Technologies (Motor transport)"**

#### ***Educational program "Transport Technologies"***

The graduating department:

##### **Transport technology and tools in agriculture**

Tel.: (044) 527-86-32

E-mail: ttnubip@ukr.net

Head – PhD, Associate Professor Petro A. Ovchar

##### **Tractors, cars and biological energy system**

Tel.: (044) 527-88-95

E-mail: avto@ukr.net

Head of Department – PhD, Professor Gennadiy A. Golub

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

Tel.: (044) 527-88-53

E-mail: vdv-tsim@ukr.net

Head – PhD, professor Valeriy D. Voytyuk

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

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

The graduating department:

##### **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 – PhD, professor Valery D. Voytyuk

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

Tel.: (044) 527-82-99

E-mail: voynaiov@bigmir.net

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

##### **Agricultural machinery and systems engineering them. Acad. P.N. Vasilenko**

Tel.: (044) 527-85-37

E-mail: sgms@ukr.net

Head of Department – PhD, Yuriy O. Gumenyuk

**Tractors, cars and biological energy system**

Tel.: (044) 527-88-95

E-mail: avto@ukr.net

Head of Department – PhD, Professor Gennadiy A. Golub

**Specialty 274 "Motor transport"**

**Educational program "Motor transport"**

The graduating department:

**Transport technology and tools in agriculture**

Tel.: (044) 527-86-32

E-mail: ttubip@ukr.net

Head – PhD, Associate Professor Petro A. Ovchar

**Tractors, cars and biological energy system**

Tel.: (044) 527-88-95

E-mail: avto@ukr.net

Head of Department – PhD, Professor Gennadiy A. Golub

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

Tel.: (044) 527-88-53

E-mail: vdv-tsim@ukr.net

Head – PhD, professor Valeriy D. Voytyuk

**Master's course  
branch of knowledge 27 "Transport"  
in specialty 275 "Transport Technologies (Motor transport)"  
in educational program "Transport Technologies"**

Form of Training:	Licensed number of persons:
– Full-time	30 persons
– Part-time	30 persons
Duration of training	
– Full-time educational and professional program	1.5 years
– Part-time	1,5 years
Credits:	
– educational and professional program	90 ECTS
Language of training	Ukrainian, English, German
Qualification of graduates:	Master in Transportation Technology

**The concept of training**

Providing knowledge and skills specialist new generation of innovation in the organization of traffic and transport management (road transport) and environmental facilities agroindustrial complexes based on modern standards of education adapted to the requirements of the world's best educational programs for the public and private sectors Ukraine.

**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.

### 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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	The name of the course	Semester	Volume	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Roads farm appointment	1	90	3
2	Loads agriculture	1	90	3
3	Sanitation and hygiene vehicles	1	120	4
4	Occupational Health	2	90	3
5	Quality Management Technology	2	120	4
6	Transport Economics	2	150	5
7	Navigation systems in transport	1	120	4
8	Testing and certification of vehicles	2	120	4
<b>Total for standard part</b>			<b>900</b>	<b>30</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	90	3
2	Business Foreign Language	1	150	5
3	Agrarian policy	1	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master program "Organization and regulation of traffic"</b>				

MASTER CURRICULA AND TRAINING PROGRAMS

№	The name of the course	Semester	Volume	
			hours	credits ECTS
1	Special methods of traffic	1	90	3
2	Transport planning of large and major cities	2	120	4
3	Supervision and examination of vehicles	2	120	4
4	Traffic Systems	2	120	4
5	Transport planning of rural areas	1	120	4
<b>Total (Disciplines offered by students)</b>			<b>570</b>	<b>19</b>
<b>Total for elective part</b>			<b>900</b>	<b>30</b>
<b>2.2.2. Master program "Organization of traffic and transport management"</b>				
1	Transportation of perishable goods	2	90	3
2	Freight forwarding activity	2	120	4
3	Recycling vehicles	1	120	4
4	Supply chain management	2	150	5
5	Technical service vehicles	2	90	3
<b>Total (Disciplines offered by students)</b>			<b>570</b>	<b>19</b>
<b>Total for elective part</b>			<b>900</b>	<b>30</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Internship	2,3	630	21
2	Preparation and defense of master's work	3	270	9
<b>Total :</b>			<b>570</b>	<b>30</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations educational plan disciplines**

**1. STANDARD ACADEMIC DISCIPLINES**

**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.

**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.

**Sanitation and hygiene vehicles.** Formation of theoretical knowledge of students about the kinds of transportation for animals and their products, modern techniques and methods of sanitization transport, packaging machinery and equipment. The course combines technological expertise with the student mastered sanitary norms and processes that are needed in growing animals, livestock production, transportation and sales.

**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.

**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.

**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.

**Navigation systems 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.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**Methodology and organization of scientific research on the basics of intellectual property.** 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.

**Business Foreign Language.** Acquiring knowledge, skills and abilities necessary to ensure that masters communicative ability in the fields of professional communication in the organization of transportations and management on motor manufacture.

**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.

### 2.2. Disciplines offered by students

#### 2.2.1. Master program "Organization and regulation of traffic"

**Special methods of traffic.** Providing knowledge on road safety with the use of special methods of traffic using state standards, state building codes, regulations and standard solutions engineering planning and organizational measures in the operation of public roads, streets, railroad crossings, using techniques described in professional literature, raise the level of road safety.

**Transport planning of large and major cities.** Analysis of the selection area for transport planning, construction, landscaping, planting systems large and major cities, networking of cultural and community services, protection and use of territories and objects of natural reserve fund.

**Supervision and examination of vehicles.** Disclosure nature and methods of developing a set of rules complete control and examination of vehicles by the specific properties of agriculture and natural production conditions, determine the need for control and expertise to achieve programmed outcomes and compliance.

Transport planning of large and major cities. Formation of system knowledge and practical skills in transport planning cities: principles and metodyratsionalnoho planning and reconstruction of transport networks taznachnyh large cities that increase the efficiency of freight and passenger transportation, safety in modern cities.

**Traffic Systems.** Formation of system of theoretical knowledge and skills and understanding the basics of system analysis of the functioning of the complex road conditions, component engineering, information telekomunitsiynoyi component,

professionally-emotional component of the driver, the acquisition of practical skills in developing and designing rational regulation of traffic.

**Transport planning of rural areas.** Analysis of the selection area for transport planning, construction, landscaping, planting systems of rural areas, networking of cultural and community services, protection and use of territories and objects of natural reserve fund.

### ***2.2.2. Master program "Organization of traffic and transport management"***

**Transportation of perishable goods.** To teach future professionals technologies freight with a short shelf life for use. To prevent spoilage of goods and identify means to protect them. Carry out works to eliminate the consequences of damage to cargo.

**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.

**Recycling vehicles.** Disclosure retsyklinhovoyh 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 retsyklinhovoyh systems, develop organizational structure retsyklinhovoyi system, allocate and analyze business processes organizations use to optimize the principles recycling system.

**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.

**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.

**Master's course**  
**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
– Part-time	1,5 years
Credits:	
– educational and professional program	90 ECTS
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.

**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.

### Areas of employment of graduates

Receives higher education and can work in positions that correspond to the 4th level of qualification according to the State classifier professions: teaching, research, organizational and administrative activities in the research departments of enterprises, research and design institutions, as well as institutions of higher education as head of production units in industry; chiefs and masters manufacturing sites; Shift; Head of Laboratory (education); leaders of student research bureau; Senior Staff, heads of research laboratories; researchers; mechanical engineers; assistants and university professors.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);

2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);

3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;

4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);

5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	The name of the course	Semester	Volume	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Legislation and Law in agriculture	1	90	3
2	Mechatronic system engineering APC	1	90	3
3	Logistics in mechanization of agriculture	2	120	4
4	Innovative engineering technologies	1	120	4
5	Ecological security processes	2	90	3
6	Economy of technological systems	2	90	3
7	Precision Agriculture	2	90	3
8	Occupational Health in	2	90	3
9	Reliability of technical systems	1	90	3
10	Safety of production processes in agroengineering	1	90	3
<b>Total for standard part</b>			<b>960</b>	<b>32</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	90	3

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	The name of the course	Semester	Volume	
			hours	credits ECTS
2	Business Foreign Language	1	150	5
3	Agrarian policy	1	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Technologies and techniques in crop"</b>				
1	Design and calculation systems in crop technologies	1	150	5
2	Designing processes in plant	2	150	5
3	Process control in crop	2	120	4
4	Labor protection on mechanized processes in plant growing	2	90	3
<b>Total (Disciplines offered by students)</b>			<b>510</b>	<b>17</b>
<b>2.2.2. Master's program "Technologies and techniques in animal husbandry"</b>				
1	Design and calculation of technological systems in animal husbandry	1	150	5
2	Designing processes in livestock	2	150	5
3	Process control in livestock	2	120	4
4	Hygiene and industrial sanitation in animal husbandry	2	90	3
<b>Total (Disciplines offered by students)</b>			<b>510</b>	<b>17</b>
<b>2.2.5. Master's program "Optimization of parameters and modes of technology AIC"</b>				
1	Designing processes and modes of technology APC	1	150	5
2	Modeling business processes and machines	2	150	5
3	Testing of agriculture technology	2	120	4
4	Management of enterprises of technical service	2	90	3
<b>Total (Disciplines offered by students)</b>			<b>510</b>	<b>17</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Internship	3	630	21
2	Preparation and defense of master's work	3	270	9
<b>Total :</b>			<b>900</b>	<b>30</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations educational plan disciplines**

**1. STANDARD ACADEMIC DISCIPLINES**

**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.

**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.

**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.

**Innovative engineering technologies** Examines theoretical and organizational bases of innovative engineering technologies. Consider their regulatory and technical support and legal laws in innovative technologies.

**Environmental safety 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 agrobiology and environment in terms of resource saving natural resources.

**Economy of technological systems.** Is to explore relations in the middle of technological systems, skills planning, pricing and investment, definition of efficiency of operation.

**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 in.** 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.

**Reliability of technical systems.** The curriculum of the discipline provides for the study of theoretical and practical issues concerning reliability and effective management of enterprises and units of technical service of machines, their interaction with manufacturers of machinery and agricultural producers, the volume of provision of services provided the seasonal production of agricultural products, a wide range of nomenclature of machines, their technical state purpose of effective use of technology, labor and socio-economic resources.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

## 2.2. Disciplines offered by students

### 2.2.1. Master's program "*Technologies and techniques in crop*"

**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 livestock.** 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.

**Labor protection on mechanized processes in crop production.** Theoretical and applied study discipline, which studies and studies: the ways and causes of emergencies from their origin and formation to manifestations and actions in systems "man-machine-industrial environment"; accident, traumatic and catastrophic situations in the production, prevention, modeling and risk management of their occurrence; criteria for assessing industrial hazards, harmful and dangerous factors of crop production.

### 2.2.2. Master's program "*Technologies and techniques 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.** 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.

**Hygiene and industrial sanitation in animal husbandry.** The discipline is aimed at studying modern methods of diagnostic research and preventive measures on infectious animal diseases. In the process of study, students learn morphological features and the cycle of development of pathogens of diseases, their systematic situation, etiology, pathogenesis and the formation of immunity of animals, as well as measures of industrial sanitation in enterprises specializing in the cultivation of animals.

### 2.2.3. Master's program "*Optimization of parameters and modes of technology AIC*"

**Design modes, processes and technology APC.** Formation of professional knowledge of students on general and specific issues managing large technical systems on the example design modes, process and technology of agriculture.

**Modeling business processes and machines.** Formation of professional knowledge of models and modeling business processes and machines, types of models and key stages of modeling, theoretical and practical methodological foundations, methods and objects object modeling of technological processes of production, economic and mathematical models and simulation processes and mechanisms for agriculture machines using a personal computer.

**Testing of agricultural machinery.** Raising general theoretical and practical research of future professionals through the assimilation of the foundations of theoretical knowledge and practical skills on general concepts and methods for testing of agricultural machinery.

**Management of enterprises of technical service.** Formation of professional knowledge of students on general and specific issues of management of large technical systems on the example of operation of machines and equipment of service enterprises, logistical support of the system.

**Master's course  
branch of knowledge 27 "Transport"  
in specialty 274 "MOTOR TRANSPORT"  
in educational program "MOTOR TRANSPORT"**

Form of Training:	Licensed number of persons:
– Full-time	50 persons
Duration of training	
– Full-time educational and professional program	1,5 years
Credits:	
– educational and professional program	90 ECTS
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.

**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.

### 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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	The name of the course	Semester	Volume	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Operational properties of cars	1	150	5
2	Applied Computer Technologies in Automobile Transport	1	120	4
3	Environmental safety of vehicles Complete computer technology in road transport	1	90	3
4	Organization and safety of motor transport	1	90	3
5	Regulatory and legal support of activity of automobile enterprises	2	90	3
6	Economy of motor transport	2	90	3
7	Transport technologies in agrarian production	2	120	4
8	Design and calculation of autoservice enterprises	2	90	3
9	Modern methods of MOT and diagnostics of automobiles	2	120	4
10	Management of motor transport enterprises	2	90	3
<b>Total for standard part</b>			<b>1050</b>	<b>35</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	90	3
2	Business Foreign Language	1	120	4
3	Agrarian policy	1	90	3
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>10</b>
<b>2.2. Disciplines offered by students</b>				
1	Alternative fuels and renewable sources of energy	1	90	3
2	Engine's working processes	1	90	3
3	Labor protection in the industry and civil protection	2	90	3
4	Tests of cars and engines	2	90	3
5	Scientific basis of technical operation of machines	2	90	3

№	The name of the course	Semester	Volume	
			hours	credits ECTS
<b>Total (Disciplines offered by students)</b>			<b>450</b>	<b>15</b>
<b>Total for elective part</b>			<b>900</b>	<b>30</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Internship	2,3	630	21
2	Preparation and defense of master's work	3	270	9
<b>Total :</b>			<b>570</b>	<b>30</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Annotations educational plan disciplines

#### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**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.

**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.

**Organization and safety of motor transport.** Studying the theoretical and organizational foundations of innovative automotive technologies. Consider their normative and technical support and legal legal acts on the organization of motor transport.

**Regulatory and legal support of activity of automobile enterprises.** To provide students with a comprehensive presentation of the main problems of legislation and law in the field of motor transport at the level of an objective, ideologically unbiased modern vision of the problems of modern science, synthesis of acquired knowledge on professional and humanitarian disciplines in a holistic world perception to create the basis for the methodological and humanitarian components of masters training.

**Economy of motor transport.** It involves studying relationships in transport systems, gaining planning skills, pricing and investing, and determining the effectiveness of the operation.

**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.

**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.

**Modern methods of MOT and diagnostics of automobiles.** In the curriculum the discipline provides for the study of theoretical and practical issues related to the reliability and effective management of enterprises and units of technical service of machines, their interaction with manufacturers, the scope of providing services in the conditions of seasonal maintenance of motor transport, a wide range of nomenclature of machines, their technical state for the purpose of efficient usetechnology, labor and socio-economic resources.

**Management of motor transport enterprises.** Formation of professional knowledge of students on the general and specific issues of management of large automobile enterprises, for example, the operation of machines and equipment of service enterprises, logistics of automobile parks.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

### 2.2. Disciplines offered by students

**Alternative fuels and renewable energy sources.** In studying the discipline, issues of the theory and practice of the use of alternative fuels in road transport are considered. The discipline is designed for obtaining Master's degree in knowledge on the rational use of fuels, lubricants, technical fluids and non-metallic materials, production of fuel and lubricants, their assortment, properties of qualities, which affects the reliability and profitability of engines of aggregates of agricultural machinery, ways of introducing fuels and lubricants on non-oil basis.

**The workings of the ICE.** Formation of knowledge of students about the main operational properties of internal combustion engines of cars and tractors and their dynamic analysis.

**Labor protection in the industry and civil protection.** The educational discipline, which describes the organizational principles for the development and implementation of the labor protection management system in the automotive industry and at the enterprises of the agro-industrial complex, organizational measures for monitoring the state of occupational safety in road transport.

**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.

**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.

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

**Director** – Doctor of Technical Sciences, Professor, Honored Worker of Science and Technique Volodymyr Kozyrskyi

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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"***

Graduating department:

**Department of Automatics and Robototechnical Systems named after acad.**

**I.I. Martynenko**

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

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

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Head of department – Doctor of Technical Sciences, Professor Mykola Grebchenko

**Department of Electric Drive and Electric Technologies named after Prof.**

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Head of department – Doctor of Technical Sciences, Associate Professor Valeryi Gorobets

**Specialty 151 "Automation and Computer integrated Technologies"**

***Educational program "Automated Control of Technological Processes"***

Graduating department:

**Department of Automatics and Robototechnical Systems named after acad.**

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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, electrical engineering and electrical 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**

#### ***Master's program "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.

***Master's program "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.

***Master's program "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.

***Master's program "Energy engineering"***

The integrated performance of the design, installation, adjustment, commissioning and maintenance of electrical current equipment. Reliability of technical systems and the quality of energy and energy resources. Technology energy engineering 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.

***Master's program "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.

***Master's program "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.

***Master's program "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.

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

***Master's program "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

***Master's program "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.

***Master's program "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.

***Master's program "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 institutes.

#### ***Master's program "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.

#### ***Master's program "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.

#### ***Master's program "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.

### **Practical training**

Practical training is carried out in educational and research facilities of the university: Separated subdivision of NULES of Ukraine "Velykosnytsinske 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.

#### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty;
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study;
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

#### **Curriculum of Master's training in educational program "Power Engineering, Electrical Engineering and Electrical Mechanics" (educational and professional program of master's training)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Safety in Electrical Installations	1	120	4
2	Electromagnetic Compatibility	1	120	4
3	Energy Security	1	120	4
4	Mathematical Modeling of Electrotechnical Systems and Their Components	1	120	4
5	Basics of Energy Saving	1	120	4
6	Information Technology	2	120	4
7	Methods of Synthesis and Analysis of ACS	2	120	4
8	Optimization Theory	2	120	4
9	Energy Supply	2	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
10	Design of electrification, automation and power supply systems	2	120	4
11	Heat and Water Supply	2	120	4
12	Technology of Maintenance and Repair of Electrical Equipment and Means of Automation	2	120	4
<b>Total for standard part</b>			<b>1440</b>	<b>48</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Agricultural Policy	1	120	4
2	Business Foreign Language	1	120	4
3	Methodology and Organization of Scientific Research on the Basics of Intellectual Property	3	120	4
<b>Total (Disciplines offered by University)</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Automation of technological processes and computer integrated systems to control information and technological resources in agriculture"</b>				
1	Control Systems in Energetics	3	120	4
2	Engineering Activities in Automation Systems Maintenance	3	150	5
3	Methods of Modern Automated Control of Technological Processes and Productions in Energetics	3	150	5
4	Software and Hardware of Control Systems in Energetics	3	150	5
5	Typical Technological Processes in Energetics and Methods of Their Modeling	3	150	5
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.2. Master's program "Electrical networks and systems"</b>				
1	Automated control systems and power consumption control	3	120	4
2	Automatics and Telemechanics of Power Supply Systems	3	120	4
3	Electrical Networks and Systems	3	120	4
4	Electric Installations and Power Supply Systems	3	120	4
5	Small Electric Stations	3	120	4
6	Design of Power Supply Systems	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.3. Master's program "Energy Supply"</b>				
1	Gas Supply	3	120	4
2	Energy Saving in Heating Technologies	3	120	4
3	Energy Saving and Using of Renewable Energy Resources	3	120	4
4	Account and Regulation of Energy Distribution and Costs	3	120	4
5	Heat and Energy Installations and Systems	3	120	4
6	Heating Technologies of Production and Processing of Agricultural Product	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.4. Master's program "Energy engineering"</b>				
1	Energy Management and Audit	3	120	4
2	Reliability of Technical Systems and Technogenic Risks	3	120	4
3	Accounting and Regulation of Energy Resources Costs	3	120	4
4	Software of Physical Researches	3	120	4
5	Technical Service of Power Equipment	3	120	4
6	Energy Engineering Technologies	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.5. Master's program "Electrotechnical systems of power consumption"</b>				
1	Automated Control Systems of Power Consumption	3	120	4
2	Renewable Sources of Electric Energy Generation	3	120	4
3	Design of Power Consumption Systems	3	120	4
4	Relay Protection and Automation of Distribution Power Networks	3	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
5	Telemechanics and ACS of Power Supply Systems	3	120	4
6	Technology of Maintenance and Repair of Electrical Plants of Power Systems	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.6. Master's program "Electrotechnics and electrotechnology"</b>				
1	Innovative Energy-Efficient Technologies of Greenhouse Production	3	120	4
2	Modeling of Adjustable Electric Drives, Aggregates and Production Lines	3	120	4
3	Optimization of Energy Systems of Livelihoods of Livestock Farms and Poultry Farms	3	120	4
4	Basics of Energy Efficiency of Consumer Power Grids	3	120	4
5	Theoretical Foundations of Bioenergy Technologies	3	120	4
6	Energy Use Control in Electrotechnological Equipment	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.7. Master's program "Lighting engineering and light sources"</b>				
1	Energy Audit in Lighting Installations	3	120	4
2	Laser Technics	3	120	4
3	Design, Installation and Operation of Lighting Installations	3	120	4
4	Lighting Installations and Systems	3	120	4
5	Physical Bases of Light Sources and Energy Saving in Lighting Installations	3	120	4
6	Photometry	3	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>Total for elective part</b>			<b>1080</b>	<b>36</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical Training		120	4
2	Writing and Defense of Master's Thesis		60	2
<b>Total</b>			<b>180</b>	<b>6</b>
<b>Total for educational program</b>			<b>2700</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)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Safety in Electrical Installations	1	120	4
2	Electromagnetic Compatibility	1	120	4
3	Energy Security	1	120	4
4	Mathematical Modeling of Electrotechnical Systems and Their Components	1	120	4
5	Basics of Energy Saving	1	120	4
6	Information Technology	2	120	4
7	Methods of Synthesis and Analysis of ACS	2	120	4
8	Optimization Theory	2	120	4
9	Energy Supply	2	120	4
10	Design of electrification, automation and power supply systems	2	120	4
11	Heat and Water Supply	2	120	4
12	Technology of Maintenance and Repair of Electrical	2	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
	Equipment and Means of Automation			
<b>Total for standard part</b>			<b>1440</b>	<b>48</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Agricultural Policy	1	120	4
2	Business Foreign Language	1	120	4
3	Methodology and Organization of Scientific Research on the Basics of Intellectual Property	3	120	4
<b>Total (Disciplines offered by University)</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Energy Efficient Control Systems of Biotechnological Objects"</b>				
1	Control Systems in Energetics	2	120	4
2	Engineering Activities in Automation Systems Maintenance	2	150	5
3	Methods of Modern Automated Control of Technological Processes and Productions in Energetics	2	150	5
4	Software and Hardware of Control Systems in Energetics	2	150	5
5	Typical Technological Processes in Energetics and Methods of Their Modeling	2	150	5
6	Biotechnological Objects of Automation, Methods of Their Research and Modeling	3	240	8
7	Information Technology in Control Systems	3	180	6
8	Computer Integrated Control Systems in Agriculture	3	240	8
9	Modern Methods of Developing Automation Systems for Biotechnological Objects	3	240	8
<b>Total (Disciplines offered by students)</b>			<b>1620</b>	<b>54</b>
<b>2.2.2. Master's program "Electrical stations, networks and systems"</b>				
1	Automated control systems and power consumption control	2	120	4
2	Automatics and Telemechanics of Power Supply Systems	2	120	4
3	Electrical Networks and Systems	2	120	4
4	Electric Installations and Power Supply Systems	2	120	4
5	Small Electric Stations	2	120	4
6	Design of Power Supply Systems	2	120	4
7	Intelligent Systems of Electroenergy	3	180	6
8	Mathematical Tasks in Optimization Problems of Power Supply	3	240	8
9	Transients in Power Supply Systems	3	240	8
10	Modes Control of Electrical Networks	3	240	8
<b>Total (Disciplines offered by students)</b>			<b>1620</b>	<b>54</b>
<b>2.2.3. Master's program "Energy Supply"</b>				
1	Gas Supply	2	120	4
2	Energy Saving in Heating Technologies	2	120	4
3	Energy Saving and Using of Renewable Energy Resources	2	120	4
4	Account and Regulation of Energy Distribution and Costs	2	120	4
5	Heat and Energy Installations and Systems	2	120	4
6	Heating Technologies of Production and Processing of Agricultural Product	2	120	4
7	Integrated Use of Alternative and Renewable Energy Sources	3	180	6
8	Modelling of Thermal and Hydrodynamic Processes	3	240	8
9	Nanotechnology of Heat and Mass Transfer Intensification	3	240	8
10	Optimization of Energy Supply Systems and Energy Efficiency	3	240	8
<b>Total (Disciplines offered by students)</b>			<b>1620</b>	<b>54</b>
<b>2.2.4. Master's program "Scientific and Technical Principles of Electromechanical Energy Conversion"</b>				

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
1	Energy Management and Audit	2	120	4
2	Reliability of Technical Systems and Technogenic Risks	2	120	4
3	Accounting and Regulation of Energy Resources Costs	2	120	4
4	Software of Physical Researches	2	120	4
5	Technical Service of Power Equipment	2	120	4
6	Energy Engineering Technologies	2	120	4
7	Mathematical Modeling of Electromagnetic Devices and Electromechanical Power Converters	3	180	8
8	Reliability of Electromagnetic Devices and Electromechanical Power Converters	3	240	6
9	Special Sections of Theoretical Electrical Engineering	3	240	8
10	Asynchronous machines of high energy efficiency	3	240	8
<b>Total (Disciplines offered by students)</b>			<b>1620</b>	<b>54</b>
<b>2.2.5. Master's program "Electrotechnical systems of power consumption"</b>				
1	Automated Control Systems of Power Consumption	2	120	4
2	Renewable Sources of Electric Energy Generation	2	120	4
3	Design of Power Consumption Systems	2	120	4
4	Relay Protection and Automation of Distribution Power Networks	2	120	4
5	Telemechanics and ACS of Power Supply Systems	2	120	4
6	Technology of Maintenance and Repair of Electrical Plants of Power Systems	2	120	4
7	Mathematical and Simulation Modeling of Processes in Electrical Networks and Systems	3	180	8
8	Estimation of Electrical Systems Modes	3	240	6
9	Electromechanical Transients in Electrical Systems	3	240	8
10	Algorithmization of Electric Power Problems	3	240	8
<b>Total (Disciplines offered by students)</b>			<b>1620</b>	<b>54</b>
<b>2.2.6. Master's program "Electrotechnics and electrotechnology"</b>				
1	Innovative Energy-Efficient Technologies of Greenhouse Production	2	120	4
2	Modeling of Adjustable Electric Drives, Aggregates and Production Lines	2	120	4
3	Optimization of Energy Systems of Livelihoods of Livestock Farms and Poultry Farms	2	120	4
4	Basics of Energy Efficiency of Consumer Power Grids	2	120	4
5	Theoretical Foundations of Bioenergy Technologies	2	120	4
6	Energy Use Control in Electrotechnological Equipment	2	120	4
7	Electromagnetic Processing of Agricultural Products	3	180	8
8	Electrotechnology Research Methods	3	240	6
9	Energy Efficiency of Closed Biosystems	3	240	8
10	Physical and Technological Properties of Agricultural Products And Materials	3	240	8
<b>Total (Disciplines offered by students)</b>			<b>1620</b>	<b>54</b>
<b>2.2.7. Master's program "Lighting engineering and light sources"</b>				
1	Energy Audit in Lighting Installations	2	120	4
2	Laser Technics	2	120	4
3	Design, Installation and Operation of Lighting Installations	2	120	4
4	Lighting Installations and Systems	2	120	4
5	Physical Bases of Light Sources and Energy Saving in Lighting Installations	2	120	4
6	Photometry	2	120	4
7	Electrotechnical Devices of Lighting Systems	3	180	8
8	Modern Research Trends in Light Engineering	3	240	6
9	Methodology of Optoelectronic Systems Construction	3	240	8

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
10	Photonics and Application of Coherent Radiation Sources	3	240	8
<b>Total (Disciplines offered by students)</b>			<b>1620</b>	<b>54</b>
<b>Total for elective part</b>			<b>1980</b>	<b>66</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical Training		120	4
2	Writing and Defense of Master's Thesis		60	2
<b>Total</b>			<b>180</b>	<b>6</b>
<b>Total for educational program</b>			<b>3600</b>	<b>120</b>

**Annotations educational plan disciplines**

**1. STANDART ACADEMIC DISCIPLINES**

**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.

**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 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.

**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.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

## 2.2. Disciplines offered by students

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

#### **2.2.1. Master's program "Automation of technological processes and computer integrated systems to control information and technological resources in agriculture"**

**Engineering Activities of Automation Systems Maintenance.** Procedure mounted delivery systems in operation. Formation and Organization of instrumentation and automation means an agricultural enterprise. Net after-sales service of power equipment. Group activities with after sales service. Care System as part of the company image – producer.

**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.

**Software and Hardware of Control 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. Architecture microprocessor and microcomputer, microprocessor programming in assembly language, microprocessor 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. Controllability. The synthesis of digital systems. Restrictions in microprocessor control systems.

**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.

#### **2.2.2. Master's program "Electrical networks and systems"**

**Automated Control Systems of Power Consumption.** Modern principles, methods and tools for monitoring and control power consumption as an important direction of energy efficiency and energy saving in agriculture.

**Automation 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

**Small electric stations.** Types of small electric stations. Features of the operation of small electric stations and their role in electricity supply. Comparative characteristics of small electricity sources. The construction of small electric stations.

**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

### ***2.2.3. Master's program "Energy supply"***

**Gas Supply.** The main characteristics of gas as an energy source. Devices of the account of gas flow. Switchgears. Consumers.

**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

**Energy Saving and Using of Renewable Energy Resources.** Types of alternative and renewable energy. Features of small power plants and their role in the power supply APC. Comparative characteristics of alternative and renewable energy sources. The construction of small power plants.

**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.

### ***2.2.4. Master's program "Energy engineering"***

**Energy Management and Audit in Agriculture.** The scope of services for the preparation and provision of installation and operation of power equipment in agriculture. Energy service in agriculture, nomenclature and implementation services. Marketing in energy services.

**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.

**Software of Physical Researches.** Computer technology visualization modes and parameters of technological facilities and manufacturing processes. Packages for processing applications and information transfer. Technical means of information technology. The global network Internet.

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

**Technologies of Energy Engineering.** Engineering as an independent field of activity. The range of engineering services. Engineering-consulting firms. Engineerresident in engineering activities. Service as a means of creating a system of relations between the company and client. Net after-sales service of power equipment. Group activities with after sales service. Care System as part of the company-producer

#### ***2.2.5. Master's program "Electrotechnical systems of power consumption"***

**Automated Control Systems of Power Consumption.** Information in control 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 control systems power supply. Technical and economic performance of automation and telemechanization.

**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.

**Technology of Maintenance and Repair of Electrical Plants of Power Systems.** 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.

#### ***2.2.6. Master's program "Electrotechnics and electrotechnology"***

**Innovative Energy-Efficient Technologies of Greenhouse Production.** Agro-technical and economic aspects of the greenhouse economy. The ratio of plants to the internal environment of greenhouses. Forms of closed soil. Theoretical bases of energy saving efficiency in agricultural production. Application of energy-saving technologies in vegetable growing of closed soil taking into account foreign and domestic experience. Application of parametric and nonparametric methods of analysis of the efficiency

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evaluation of the productive resources use in the greenhouse. Analysis of economy efficiency indicators and energy consumption modeling in the greenhouse. Improving of energy conservation efficiency in vegetable growing of closed soil on the basis of the use of alternative energy sources.

**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.

**Optimization of Energy Systems of Livelihoods of Livestock Farms and Poultry Farms.** Concept of ecological and ecological-economic potentials. Normative documents for designing enterprises for the production of livestock products and poultry farms. Calculation of the number of animals in premises for the maintenance of various groups of animals. Study of master plans of poultry farms. Technological equipment for: heating, lighting, distribution of feed, drinking. The concept of life-support energy systems. Parameters of life support. Criteria for optimization. Method of optimization of energy systems for livestock provision of livestock farms and poultry farms.

**Basics of Energy Efficiency of Consumer Power Grids.** The energy problem, its roots and approaches to the solution. General characteristics of the fuel and energy complex of Ukraine. Ensuring the energy security of the state. Energy saving potential in Ukraine. Legislation in the field of energy saving. Characteristic problems in the field of power supply. Implementation of the latest technologies as a method of energy saving. Application of automatic power control systems as a method of energy saving. Implementation of alternative energy sources as a method of energy saving. Energy-saving technologies in the industry. Energy saving in agro-industrial complex.

**Theoretical Foundations of Bioenergy Technologies.** Renewable resources for energy generating bioenergy. Biomass production of polyferment systems for the conversion of chemical and light energy into renewable energy sources. Technologies for producing solid biomass fuels (from green biomass, peat, coal and waste). Thermal methods, equipment and technologies for obtaining energy from solid biomass and waste. Biofuel elements and prospects for their use. Biopreparations for the intensification of bioenergetic processes. Safety in the operation of this category of technology. Fuel Standards. Features of the use of gas and liquid biofuels in power plants and their impact on them.

**Energy Use Control in Electrotechnological Equipment.** The essence and tasks of normalization of energy consumption. Types of norms of specific energy consumption and requirements to them. Methods of determination of the norms of specific costs. Installations of electric arc heating: Arc furnaces direct, and mixed heating. Technological process and characteristics of electric regimes. Energy saving and optimization of asymmetric, non-sinusoidal and sharp-mode modes of operation of electrotechnical installations. Management of energy use in electrotechnical installations in asymmetric and non-sinusoidal modes. Structure of technological organizational and technical measures. Methods and means of energy storage.

**2.2.7. Master's program "Lighting engineering and light sources"**

**Energy audit in lighting installations.** Energy efficiency in the field of production, transmission and consumption of electric and thermal energy. Main directions of energy

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resources saving. Ways of energy resources saving. Global Experience, achievements and strategic guideline for energy efficiency policy. Main directions of energy saving. Energy balance of the enterprise. Ways of obtaining energy balances and energy characteristics of aggregates. Calculation of electricity saving in lighting installations.

**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.

**Photometry** The nature of the light. The laws of reflection and refraction of light. Interference and diffraction. Bou's postulates. Types of spectra. Spectral devices. Spectral analysis. Flow of energy and radiation. Light Flux. The power of light. Illumination Brightness. Laws of illumination. Free electromagnetic oscillations. The oscillatory contour, the energy transformation in it. Parameters of electromagnetic oscillations. The Thompson formula. Resonance.

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

### **2.2.1. Master's program "Energy Efficient Control Systems of Biotechnological Objects"**

**Engineering Activities of Automation Systems Maintenance.** Procedure mounted delivery systems in operation. Formation and Organization of instrumentation and automation means an agricultural enterprise. Net after-sales service of power equipment. Group activities with after sales service. Care System as part of the company image – producer.

**Methods of Modern Process and Production Control in Energetics.** Characteristics of technological processes as control facilities and their disturbances.

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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.

**Software and Hardware of Control 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. Architecture microprocessor and microcomputer, microprocessor programming in assembly language, microprocessor 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. Controllability. The synthesis of digital systems. Restrictions in microprocessor control systems.

**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.

**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.

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### **2.2.2. Master's program "Electrical stations, networks and systems"**

**Automated Control Systems of Power Consumption.** Modern principles, methods and tools for monitoring and control power consumption as an important direction of energy efficiency and energy saving in agriculture

**Automation 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

**Small electric stations.** Types of small electric stations. Features of the operation of small electric stations and their role in electricity supply. Comparative characteristics of small electricity sources. The construction of small electric stations.

**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 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.

### **2.2.3. Master's program "Energy Supply"**

**Gas Supply.** The main characteristics of gas as an energy source. Devices of the account of gas flow. Switchgears. Consumers.

**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

**Energy Saving and Using of Renewable Energy Resources.** Types of alternative and renewable energy. Features of small power plants and their role in the power supply APC. Comparative characteristics of alternative and renewable energy sources. The construction of small power plants.

**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.

#### ***2.2.4. Master's program "Scientific and Technical Principles of Electromechanical Energy Conversion"***

**Energy Management and Audit in Agriculture.** The scope of services for the preparation and provision of installation and operation of power equipment in agriculture. Energy service in agriculture, nomenclature and implementation services. Marketing in energy services.

**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.

**Software of Physical Researches.** Computer technology visualization modes and parameters of technological facilities and manufacturing processes. Packages for processing applications and information transfer. Technical means of information technology. The global network Internet.

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

**Technologies of Energy Engineering.** Engineering as an independent field of activity. The range of engineering services. Engineering-consulting firms. Engineerresident in engineering activities. Service as a means of creating a system of relations between the company and client. Net after-sales service of power equipment. Group activities with after sales service. Care System as part of the company-producer

**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.

#### ***2.2.5. Master's program "Electrotechnical systems of power consumption"***

**Automated Control Systems of Power Consumption.** Information in control 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 control systems power supply. Technical and economic performance of automation and telemechanization.

**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.

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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.

**Technology of Maintenance and Repair of Electrical Plants of Power Systems.** 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.

**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.

#### ***2.2.6. Master's program "Electrotechnics and electrotechnology"***

**Innovative Energy-Efficient Technologies of Greenhouse Production.** Agro-technical and economic aspects of the greenhouse economy. The ratio of plants to the internal environment of greenhouses. Forms of closed soil. Theoretical bases of energy saving efficiency in agricultural production. Application of energy-saving technologies in vegetable growing of closed soil taking into account foreign and domestic experience. Application of parametric and nonparametric methods of analysis of the efficiency evaluation of the productive resources use in the greenhouse. Analysis of economy efficiency indicators and energy consumption modeling in the greenhouse. Improving of energy conservation efficiency in vegetable growing of closed soil on the basis of the use of alternative energy sources.

**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

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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.

**Optimization of Energy Systems of Livelihoods of Livestock Farms and Poultry Farms.** Concept of ecological and ecological-economic potentials. Normative documents for designing enterprises for the production of livestock products and poultry farms. Calculation of the number of animals in premises for the maintenance of various groups of animals. Study of master plans of poultry farms. Technological equipment for: heating, lighting, distribution of feed, drinking. The concept of life-support energy systems. Parameters of life support. Criteria for optimization. Method of optimization of energy systems for livestock provision of livestock farms and poultry farms.

**Basics of Energy Efficiency of Consumer Power Grids.** The energy problem, its roots and approaches to the solution. General characteristics of the fuel and energy complex of Ukraine. Ensuring the energy security of the state. Energy saving potential in Ukraine. Legislation in the field of energy saving. Characteristic problems in the field of power supply. Implementation of the latest technologies as a method of energy saving. Application of automatic power control systems as a method of energy saving. Implementation of alternative energy sources as a method of energy saving. Energy-saving technologies in the industry. Energy saving in agro-industrial complex.

**Theoretical Foundations of Bioenergy Technologies.** Renewable resources for energy generating bioenergy. Biomass production of polyferment systems for the conversion of chemical and light energy into renewable energy sources. Technologies for producing solid biomass fuels (from green biomass, peat, coal and waste). Thermal methods, equipment and technologies for obtaining energy from solid biomass and waste. Biofuel elements and prospects for their use. Biopreparations for the intensification of bioenergetic processes. Safety in the operation of this category of technology. Fuel Standards. Features of the use of gas and liquid biofuels in power plants and their impact on them.

**Energy Use Control in Electrotechnological Equipment.** The essence and tasks of normalization of energy consumption. Types of norms of specific energy consumption and requirements to them. Methods of determination of the norms of specific costs. Installations of electric arc heating: Arc furnaces direct, and mixed heating. Technological process and characteristics of electric regimes. Energy saving and optimization of asymmetric, non-sinusoidal and sharp-mode modes of operation of electrotechnical installations. Management of energy use in electrotechnical installations in asymmetric and non-sinusoidal modes. Structure of technological organizational and technical measures. Methods and means of energy storage.

**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.

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**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.

### ***2.2.7. Master's program "Lighting engineering and light sources"***

**Energy audit in lighting installations.** Energy efficiency in the field of production, transmission and consumption of electric and thermal energy. Main directions of energy resources saving. Ways of energy resources saving. Global Experience, achievements and strategic guideline for energy efficiency policy. Main directions of energy saving. Energy balance of the enterprise. Ways of obtaining energy balances and energy characteristics of aggregates. Calculation of electricity saving in lighting installations.

**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.

**Photometry** The nature of the light. The laws of reflection and refraction of light. Interference and diffraction. Bou's postulates. Types of spectra. Spectral devices. Spectral

analysis. Flow of energy and radiation. Light Flux. The power of light. Illumination Brightness. Laws of illumination. Free electromagnetic oscillations. The oscillatory contour, the energy transformation in it. Parameters of electromagnetic oscillations. The Thompson formula. Resonance.

**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"**

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 computer systems and automatics

**The concept of training**

Educational activities while ensuring fulfillment of state orders and other agreements with legal entities and individuals for training specialists with higher education is carried out in accordance with state standards of higher education. Courses in the Institute of Energy, automation and energy saving based on a systems approach between the objective and principles of learning to educate students broadmindedness non-standard thinking, overhead and ability to solve social and economic problems in their relationship and to meet the needs of modern production and con 'situation on the labor market.

An integral part of the educational activity is an educational process that involves the education of future professionals in the best traditions of national and world culture taking into account the human priorities, Recovery and development of the national economy, culture, science, spiritual unity of the nation and the people of Ukraine.

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

***Master's program "Computer-Integrated Process Control Systems  
of Livestock Production"***

Research, development and implementation of computer integrated control systems in animal husbandry. Technology and mathematical modeling of processes in livestock, automated process control systems in animal husbandry.

**Areas of employment for graduates**

Engineer CEA poultry, engineer of APCS livestock complex, engineer maintenance of automation systems in the enterprise.

***Master's program "Computer-Integrated Process Control Systems of Crop  
Production"***

Research, development and implementation of computer-integrated control systems in crop production. Technology and mathematical modeling of processes in the plant, automated process control systems in the plant.

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

Engineer Department APCS greenhouses, Engineer CEA greenhouses, engineer maintenance of automation systems in the enterprise.

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

#### ***Master's program "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 SAR 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.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);

5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational program "Automation and computer integrated technologies"  
(educational and professional program of master's training)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Philosophy of Science and Innovation	1	90	3
2	Civil Protection	1	90	3
3	Automated Accounting of Energy and Material Resources	2	120	4
4	Computer-Simulation Control Systems in Agriculture	2	150	5
5	Technological Processes Automation	2	150	5
6	Installation, Commissioning and Maintenance of Automation Systems	2	120	4
7	Special Sections of High Mathematics	1	90	3
8	CAD of Automation Systems in Agriculture	2	150	5
9	ACS of Technological Processes in Agriculture	2	120	4
10	Safety in the Area	1	90	3
<b>Total for standard part</b>			<b>1170</b>	<b>39</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Agricultural Policy	3	90	3
2	Methodology and Organization of Scientific Research on the Basics of Intellectual Property	2	90	3
3	Business Foreign Language	1	150	5
<b>Total (Disciplines offered by University)</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
1	Calculations of Economic Efficiency of Scientific Developments	3	90	3
2	Neuro Information Control Networks of Biotechnical Objects	3	120	4
3	Object-Oriented Programming	2	90	3
4	Robotic Complex and Systems in Agriculture	3	90	3
5	Modeling and Identification of Biotechnical Objects in Agriculture	2	150	5
<b>Total</b>			<b>540</b>	<b>18</b>
<b>2.2.1. Master's program "Computer-Integrated Process Control Systems of Livestock Production"</b>				
1	Methods and Tools of Modern Automated Control of Technological Processes and Productions in Livestock	3	90	3
2	Features Computer Integrated Control Systems in Livestock	3	90	3
<b>Total for master's program</b>			<b>180</b>	<b>6</b>
<b>2.2.2. Master's program "Computer-Integrated Process Control Systems of Crop Production"</b>				
1	Methods and Tools of Modern Automated Control of Technological Processes and Productions in Crop	3	90	3
2	Features Computer Integrated Control Systems in Crop Production	3	90	3
<b>Total for master's program</b>			<b>180</b>	<b>6</b>
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>Total for elective part</b>			<b>1050</b>	<b>35</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical Training	1	300	10
2	Writing and Defense of Master's Thesis	3	180	6
<b>Total</b>			<b>480</b>	<b>16</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Curriculum of Master training  
in educational program "Automation and computer integrated technologies"  
(educational and research program of master's training)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Philosophy of Science and Innovation	1	90	3
2	Civil Protection	1	90	3
3	Automated Accounting of Energy and Material Resources	2	120	4
4	Computer-Simulation Control Systems in Agriculture	2	150	5
5	Technological Processes Automation	2	150	5
6	Installation, Commissioning and Maintenance of Automation Systems	2	120	4
7	Special Sections of High Mathematics	1	90	3
8	CAD of Automation Systems in Agriculture	2	150	5
9	ACS of Technological Processes in Agriculture	2	120	4
10	Safety in the Area	1	90	3
<b>Total for standard part</b>			<b>1170</b>	<b>39</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Agricultural Policy	3	90	3
2	Methodology and Organization of Scientific Research on the Basics of Intellectual Property	4	360	12
3	Business Foreign Language	1	150	5
<b>Total (Disciplines offered by University)</b>			<b>600</b>	<b>20</b>
<b>2.2. Disciplines offered by students</b>				
1	Calculations of Economic Efficiency of Scientific Developments	3	90	3
2	Neuro Information Control Networks of Biotechnical Objects	3	120	4
3	Object-Oriented Programming	2	90	3
4	Robotic Complex and Systems in Agriculture	3	120	4
5	Modeling and Identification of Biotechnical Objects in Agriculture	2	150	5
6	Computer Integrated Control Systems	2	90	3
7	Intelligent Control Systems of Biotechnical Objects	4	360	12
<b>Total</b>			<b>1020</b>	<b>34</b>
<b>2.2.1. Master's program "Energy Efficient Control Systems of Biotechnological Objects"</b>				
1	Special Systems	3	180	6
2	Methods for Preparing Research	4	150	5
<b>Total for master's program</b>			<b>330</b>	<b>11</b>
<b>Total (Disciplines offered by students)</b>			<b>1350</b>	<b>45</b>
<b>Total for elective part</b>			<b>1950</b>	<b>65</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical Training	1	300	10
2	Writing and Defense of Master's Thesis	4	180	180
<b>Total</b>			<b>380</b>	<b>16</b>
<b>Total for educational program</b>			<b>3600</b>	<b>120</b>

**Annotations educational plan disciplines**

**1. STANDART ACADEMIC DISCIPLINES**

**Philosophy of Science and Innovation.** Science and reality. The role of theory in the knowledge of phenomena in nature and society. The relationship of theoretical

knowledge and practical tools. Logical-mathematical and theoretical methods of processing the results of the experiment.

**Civil Protection.** Theoretical foundations of civil defense and safety in production and life. Prevention of disasters and elimination of their organization adverse effects.

**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

**Computer-Simulation Control Systems in Agriculture.** 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.

**Technological Processes Automation.** Specifications processes as facilities management and their disturbances. Principles of automated process control systems. Automation of technological processes in crop and livestock production.

**Installation, Commissioning and Maintenance of Automation Systems.** 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.

**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.

**CAD of Automation Systems in Agriculture.** 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.

**ACS of Technological Processes in Agriculture.** 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.

**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. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

## 2.2. Disciplines offered by students

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

**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.

**Neuro Information Control Networks 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.

**Object-Oriented Programming.** 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.

**Robotic Complex and Systems in Agriculture.** 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.

**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.

**2.2.1. Master's program "Computer-Integrated Process Control Systems of Livestock Production"**

**Methods and Tools of Modern Automated Control of Technological Processes and Productions in Livestock.** Modeling of technical and biological objects under uncertainty: 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 Computer Integrated Control System in Livestock.** Principles of the control systems. Information channels and their characteristics. Identification of control objects. Algorithms management. Technical means of automation. Reliability and economic efficiency of automation.

**2.2.2. Master's program "Computer-integrated Process Control Systems of Crop Production"**

**Methods and Tools of Modern Automated Control of Technological Processes and Productions in Crop.** 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 Computer Integrated Control System in the Crop Production.** 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.

**2.2. Disciplines offered by students**

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

**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.

**Neuro Information Control Networks 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.

**Object-Oriented Programming.** 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.

**Robotic Complex and Systems in Agriculture.** 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.

**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.

**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.

**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.

### ***2.2.1. Master's program "Energy Efficient Control Systems of Biotechnological Objects"***

**Special Systems.** Special subjects in the study which students have to study methods of creating, optimizing adaptive control systems, control systems built on fuzzy logic. Creation of research systems, their configuration and optimization must take place in an environment in MatLAB Packages Simulink and Fuzzy Logis. Also laid the foundations of genetic learning of neural networks is the basis for building intelligent controllers.

**Methods for Preparing Research.** Within the course presents the main stages of scientific research of the problem of system-analytical position and generalized requirements for methods of materials processing research. Lecture and laboratory practical course material covers the entire range of the materials for their research publications in general and, in particular, consider writing the competent scientific text. It may be, for example, research papers, thesis or reports, reviews of scientific means ordering information, summarizing the results of the pilot study, graphical interpretation of research results and more.

## EDUCATIONAL AND RESEARCH INSTITUTE OF FORESTRY AND PARK GARDENING MANAGEMENT

**Director** - Doctor of Agricultural Sciences, Professor Petro Lakyda  
Tel: (+38044) 527-85-28  
E-mail: lakyda@nubip.edu.ua  
Situating: educational building №1, room 119

The ERI organizes and coordinates educational process of master training in education program within specialties:

### **Specialty 205 "Forestry"**

#### ***Educational program "Forestry"***

Departments in charge of graduate training:

##### **Silviculture**

Tel.: (044) 527-82-82

E-mail: lisivnutstvo@gmail.com

Head of the Department – doctor of science, professor Anatolii Bondar

##### **Forest management**

Phone: (044) 527-83-70

E-mail: domashovets@nubip.edu.ua

Head of the Department – PhD of Agricultural Sciences, associated professor Galina Domashovec

##### **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

##### **Forest mensuration and forest inventory**

Tel.: (044) 527-85-23

E-mail: aagirs@ukr.net

Head of the Department – doctor of science, professor Oleksandr Girs

##### **Forest biology and game management**

Tel.: (044) 527-82-38

E-mail: npuzrina@nubip.edu.ua

Head of the Department – PhD of Agricultural Sciences, associated professor Natalia Pyzrina

### **Specialty 206 "Park and Gardening Management"**

#### ***Educational program "Park and Gardening Management"***

Departments in charge of graduate training:

##### **Landscape architecture and landscape construction:**

Tel.: (+38044) 527-82-96

E-mail: a-kushnir@ukr.net

Head of the department – PhD of Biological Sciences, associated Professor Anatoliy Kushnyr

**Landscape gardening and floristic:**

Tel.: (+38044) 258-47-27

E-mail: kafdecsad.nubip@gmail.com

Head of the department – Doctor of Biological Sciences, Professor Serhii Popovych

**Forest Restoration and Meliorations**

Tel.: (044) 87-47

E-mail: forest\_crops@nubip.edu.ua

Head of the Department – PhD of Agricultural Sciences, professor Viktor Maurer

**Specialty 187 “Wood processing and furniture technologies”**

***Educational Program “Wood processing and furniture technologies”***

Departments in charge of graduate training:

**Wood products technologies and design:**

Tel.: (+38044) 527-81-67

E-mail: opinchewska@gmail.com

Head of the department - Doctor of Technical Sciences, professor Olena Pinchevska

**Training of masters of sciences  
branch of knowledge "Agricultural science and food"  
in specialty 205 "FORESTRY"  
in educational program "FORESTRY"**

Form of Training:	Licensed number of persons:
– Full-time	100
– Part-time	75
Duration of Training:	
– Full-time educational and professional program	1,3 years
– Part-time	1,5 years
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
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.

***Master's program "Silvics and practical silviculture"***

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 graduates' employment***

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).

***Master's program "Forest melioration"***

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**

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 (ranger, chief ranger, forestry engineer, forestry engineer, agroforester), Ukrainian Research Institute of Forestry and agroforestry, Ukrainian center for training, retraining and advanced training of forestry "Ukrtsentrkadrylis" related higher education institutions of I-IV accreditation levels, zoological parks, the Nature Reserve Fund, Ukrainian State Design Institute of Forestry "Ukrdipolis", Ministry of Environment and Natural Resources of Ukraine (scientist).

#### ***Master's program "Renewal and breeding of the forest"***

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.

### **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).

#### ***Master's program "Forest Protection"***

The program focuses on the cultivation of complex professional knowledge and practical skills for developing bio-ecological fundamentals of a comprehensive protection and recovery of forest biomes, researching forest pathogens and improving system measures to combat them.

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

Post-graduates are employed in such enterprises: state forestry and hunting enterprises of the State Agency of Forest Resources of Ukraine (as forest ranger, chief forest ranger, forestry engineer, forestry engineer, forest protection engineer), State forest protection association (forest pathologist, chief forest pathologist), Ukrainian center for training, retraining and advanced training of forestry, associated higher education institutions of I-IV accreditation levels, zoological parks and Nature Reserve Fund institutions, Forestry Project Institute, Ministry of Ecology and Natural Resources of Ukraine (scientist).

#### ***Master's program "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.

***Master's program "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 "Ukrdipolis", Ministry of Ecology and Natural Resources of Ukraine (scientist).

***Master's program "Game management"***

The program focuses on the development of professional knowledge to manage populations and habitat for game animals, conservation and sustainable use of game animal resources, evaluation and optimization of hunting grounds.

**Areas of employment of graduates**

Post-graduates are employed in such enterprises: state forestry and hunting enterprises of the State Agency of Forest Resources of Ukraine (as forest ranger, chief forest ranger, forestry engineer, forestry engineer, forest protection engineer), State forest protection association (forest pathologist, chief forest pathologist), Ukrainian center for training, retraining and advanced training of forestry, associated higher education institutions of I-IV accreditation levels, zoological parks and Nature Reserve Fund institutions, Forestry Project Institute", Ministry of Ecology and Natural Resources of Ukraine (researcher positions).

**Proposed Topics for Master Theses**

1. Analysis and improvement of methods for stands growing stock assessment of forest enterprise.
2. Role of erosion and reclamation properties ravine and gully vegetation in forest enterprises.
3. Sanitary condition of arboretum: cells of pathogens and insect pests.
4. Increasing of productivity and improving of the quality of the forest plantations by care cuttings in forestry enterprises.
5. Improvement of forest fire protection in forestry enterprises.
6. An improvement of high-quality composition and increase of the productivity of the forest planting is in forest enterprises.
7. Natural renewal of main forestry breeds is in the prevailing types of site conditions in Forestry enterprises.
8. Ways of perfection of growing of forest cultures are in forestry enterprises
9. Sanitary condition Arboretum: cell pathogens and insect pests.
10. Current status and characteristics game management in Ukraine.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Forestry Management	1	120	4
2	Regulation of forest productivity	1	150	5
3	GIS technology	1	150	5
4	Planning Forestry	1	180	6
<b>Total for standard part</b>			<b>600</b>	<b>20</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Forest policy	1	120	4
2	Business foreign language	1	120	4
1	Methodology and organization of scientific research on the basics of intellectual property	1	120	4
<b>Total (Disciplines offered by University)</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Silvics and practical silviculture"</b>				
1	Forest production	2	180	6
2	Forest roads and forest vehicles	2	150	5
3	Forestry commodity	2	120	4
4	Geobotany	2	120	4
5	Increasing the productivity of forests by forestry methods	2	180	6
6	Non-wood products and adverse use of forests	2	120	4
7	Biological bases of thinning	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>990</b>	<b>33</b>
<b>2.2.2. Master's program "Forest melioration"</b>				
1	Inventory of protective plantations	2	120	4
2	Forest recultivation of land	2	120	4
3	Erosion science	2	150	5
4	Systems of erosion soils control	2	210	7
5	Forest-agricultural landscapes	2	150	5
6	Protective plantations in the ways vehicles	2	120	4
7	Hydrotechnical reclamation	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>990</b>	<b>33</b>
<b>2.2.3. Master's program "Forest Protection"</b>				

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
1	Forest Pathology with the basics of Phytoimmunity	2	150	5
2	Monitoring Harmful Organisms of Forest Ecosystems	2	180	6
3	Forest nematology	2	120	4
4	Forest Phytopathobacteriology	2	120	4
5	Diagnosis of Forest Diseases	2	120	4
6	Mycotrophy of Woody Plants	2	120	4
7	Integrated Forest Protection	2	180	6
<b>Total (Disciplines offered by students)</b>			<b>990</b>	<b>33</b>
<b>2.2.4. Master's program "Renewal and breeding of the forest"</b>				
1	Industrial methods of forest plantions	2	120	4
2	Modern technologies of seed production and nursery	2	150	5
3	Microclonal propagation of woody plants	2	150	5
4	Forestry methods of rehabilitation of the technogenic-broken earth	2	120	4
5	Ecological bases of reforestation and afforestation	2	180	6
6	Forest-cultural methods to increase the productivity of forests	2	150	5
7	Forest plants of green belts	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>990</b>	<b>33</b>
<b>2.2.5. Master's program "Reproduction of forests and forest melioration"</b>				
1	Modern technologies of seed production and nursery	2	150	5
2	Industrial methods of forest plantions	2	120	4
3	Forestry methods of rehabilitation of the technogenic-broken earth	2	120	4
4	Ecological bases of reforestation and afforestation	2	180	6
5	Forest-cultural methods to increase the productivity of forests	2	150	5
6	Systems of erosion soils control	2	150	5
7	Optimization of forest-agricultural landscapes	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>990</b>	<b>33</b>
<b>2.2.6. Master's program "Management of forest resources and forestry business"</b>				
1	Special type of measurements and Forest inventory	2	210	7
2	Forest resources management	2	150	5
3	Forest Productivity Modeling	2	120	4
4	Forest Inventory and Forest Monitoring	2	120	4
5	Forestry Economics	2	120	4
6	Foreign trade in forest sector	2	120	4
7	Information systems in forestry	2	150	5
<b>Total (Disciplines offered by students)</b>			<b>990</b>	<b>33</b>
<b>2.2.7. Master's program "Game management"</b>				
1	Hunting tourism and regional hunting features	2	150	5
2	Zoo and reintroduction of wildlife	2	180	6
3	Hunting resources and hunting products.	2	150	5
4	Innovative technologies in the hunting industry	2	120	4
5	Fundamentals of zoogeography and hunting	2	120	4

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
	zoning			
6	Aviary breeding and transportation of wild raites	2	150	5
7	Management of Hunting Animals	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>990</b>	<b>33</b>
<b>Total for elective part</b>			<b>1350</b>	<b>45</b>
<b>3. OTHER TYPES OF TRAINING</b>				
Training practice			<b>60</b>	<b>2</b>
Production practice			<b>540</b>	<b>18</b>
Preparation and defense of master's thesis			<b>150</b>	<b>5</b>
<b>Total</b>			<b>750</b>	<b>25</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Annotations of disciplines in the curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**Information technology in forestry.** 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 I / d plants. Planning costs of forest products in market conditions. Financial planning for forest enterprises. Features pricing and their bottom Forestry enterprise.

#### 2. ELECTIVE ACADEMIC DISCIPLINES

##### 2.1. Disciplines offered by University

**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.

## 2.2. Disciplines offered by students

### 2.2.1. Master's program "*Silvics and practical silviculture*"

**Forestry production.** Technology Organization upper storage, loading and unloading depots in the upper plains and mountains. Lower stocks: organization works to lower stocks. Transport: optimization of the parameters of the motor Downloads timber wagons. Technology and regulations. Export products. Methods for machining wood. Elementary cutter. Wood cutting resistance, strength and power cut. The main types of woodworking machines. Wood processing on lower landing and woodworking shops.

**Forest roads and forest vehicles.** Study course «Forest roads and forest vehicles» forms the scientific knowledge concerning the design, construction and maintenance of forest roads and vehicles, which can effectively solve the problem of reforestation, forest protection organization of forest management and apply their received skills in practice.

**Forestry commodity.** The structure of the wood, its physical and mechanical properties. Drawbacks of wood. Properties, methods of drying and storage timber. Accounting, sorting, labeling. Requirements for raw materials.

**Geobotany.** The discipline involves studying the basic patterns of structure and plant communities' dynamics, in particular, forest phytocenoses. The main characteristic of forest vegetation in the context of Ukraines' natural zones is given, structures' peculiarities, formation, geographical distribution, ecological-cootic features and anthropic transformation are indicated.

Discipline reveals links of forest ecology with other types of environmental sciences. The discipline includes the study of the impact of environmental factors, in particular, anthropic (drainage, fire) on all types of forest productivity. Forest typology, directions of its development and modern significance.

**Improving the forest productivity by Silviculture methods.** Based on in-depth study of processes of organic matter in tree plants and forestry methods influence the activation of growth processes to enhance of tree productivity and improve the quality of future stands. The place forest science of Ukraine in international structures are illustrated.

**Non-timber forest resources and harvesting of minor forest products.** This discipline studies the types of non-timber forest products and methods of its management, ways to improve the quality and productivity of forest fruit plants, medicinal plants, grazing land and harvest methods. Also considered extraction technology of birch sap, forest growing fruit plants in plantations. Honey plants and their resources are studied and ways of its increase in forests of Ukraine.

**Biological basis of thinning.** It reveals the impact of thinning on tree stands for the light and change the microclimate, which positively affects the physiological processes of trees, their growth and development.

### ***2.2.2. Master's program "Forest melioration"***

**Inventory of protective plantations.** Basics ordering protective plantations. Legal basis of regulation of protective vegetation. Agroforestry regulation of protective forest plantations on agricultural lands. Contemporary forest management.

**Forest recultivation of land.** Objects of recultivation and causes of disturbed of land cover. Directions of recultivation. Specificity of sites of disturbed territories. Methods of improving soil compositions of soil recultivation layer. Features of technologies for the creation of afforestation for various objects of recultivation. Environmental aspects of biological recultivation of land.

**Systems of erosion soils control.** Rationale for zonal systems. The system measures against water erosion: organizational and economic, agronomic and agroforestry, hydraulic measures. The set of measures to combat wind erosion (deflation). Erosion in mountainous areas and measures to combat it. Features of zonal systems. Economics and Organization works to protect the soil of erosion.

**Forest-agricultural landscapes.** Crop rotations and farming systems. Land Management and agroforestry ordering. Organization of erosion area. Agroforestry plantations in the structure of FAL - types, placement, efficiency. Forest area. Principles of creation of FAL. The criterion of optimality, optimization model FAL. System of normative reference data for assessing environmental and economic efficiency of FAL.

**Protective plantations in the ways vehicles.** Experience the protective afforestation in the ways vehicles. Types of protective forest plantations, their properties and accommodation. Forms snow deposits. Categories of snow accumulation ways of transport. Design of protective forest plantations in the ways of transport. Cost-effectiveness of afforestation in the ways vehicles.

**Hydrotechnical reclamation.** Environmental aspects hydrotech melioration. Key elements of hydrology, hydraulics and hidrometriyi. Irrigation and water supply. Drainage of forest lands. Irrigation. Irrigation regime. Irrigation system. Salinization of soils and how they demineralized.

### ***2.2.3. Master's program "Forest Protection"***

**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.

**Forest Nematology.** Nematodes in the pathology of the forest. Morphology, biology, ecology and taxonomy phytonematodes. Relationship of nematodes in plant groups. Symptoms of phytohelminths. Nematodoses of forest woody plants at different stages of their ontogenesis. Distribution and harmfulness of phytohelminths. Useful nematodes. Theoretical and applied principles of forest protection against nematodes.

**Forest Phytopathobacteriology.** Phytopathogenic bacteria in the general pathology of the forest. Morphological, biological, physiological and cultural properties of bacteria. Classification and taxonomy of bacteria. Propagation and spread of bacteria in nature. Aetiology and symptomatology of bacteriosis of forest tree plants. Theoretical - applied aspects of forest protection from pathogens bacteriosis.

**Diagnosis of Forest Diseases.** Fundamentals of teaching on the diagnosis of forest diseases. Methodology and technique of phytopathological research and forest-pathological surveys. Macroscopic and microscopic methods of diagnosing forest diseases. Diagnosis of diseases of forest trees and bush plants on the symptoms of pathology and anatomical and morphological characteristics of pathogens. Diagnosis of diseases of forest tree plants by means of physical and chemical methods (diagnostic devices, equipment and tools). Biological analysis. Diagnostics of biodestruction of harvested wood.

**Mycotrophy of Woody Plants.** Mycorrhizal fungi of forest biocenoses. Structure, nutrition, growth and development of agaric macromycetes - mycorrhiza. Methodical principles of accounting for mycorrhiza-forming fungi. Ways and methods of preserving the species diversity of mycorrhizal fungi and their reproduction. Protection of mushrooms from pests and pathogens.

**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.

#### ***2.2.4. Master's program "Renewal and breeding of the forest"***

**Modern technologies of seed production and nursery.** Varietal forest seed growing in Ukraine: current status, problems and prospects. Organization of a permanent forest seed base on a genetic selection basis. Normative-legal base of forest varietal seed growing. Structure, main provisions, scope and use of the Laws of Ukraine "On seeds and planting material", "On Plant Quarantine", "On Protection of Rights to Plant Varieties of Ukraine". Tree nursery Ukraine: the current state, the main problems, the main development trends and ways of improvement. Theoretical and practical basis of vegetative reproduction of woody plants. Ways of modernizing the cultivation of seedlings in the open ground with an open root system. Growing planting material of woody plants with a closed root system. Agrotechnical features of growing seedlings in a closed ground. Features of growing large-scale ornamental seedlings. Methods of rehabilitation of lands of permanent forest nurseries.

**Microclonal propagation of woody plants.** Modern trends culture of isolated cells, tissues and organs of plants. Fundamentals of biosafety. Advantages of microclonal reproduction method over traditional methods. Features regenerate plants in vitro. Types and main stages microclonal reproduction. Preparation of virus-free planting material. The main directions of biotechnology research in forestry. Features of propagation of woody species. The influence of genetic, physiological, hormonal and physical factors on plant micropropagation. Adaptation of plants regenerants to the conditions in vivo. The use of plant material plants regenerants in silvicultural production.

**Forestry methods of rehabilitation of the technogenic-broken earth.** Technogenesis and its importance in modern society. Types and agrotechniques of establishment of forest plantations in anthropogenically polluted lands. Types and agrotechniques of establishment of forest plantations in the man-disturbed lands.

**Industrial methods of forest growth.** Potential productivity of plantation and selection of arboreal plants. Principles of organization of raw materials plantations. Improvement of habitat terms. Regional technologies of creation of raw materials plantations of coniferous and leafy arboreal kinds. Features of creation of arboreal plants plantations of the different having a special purpose setting.

**Ecoadaptational restoration of forests.** Current approaches to restoration of forests and their importance in the context of sustainable forest management. Basic principles of ecoadaptational restoration of forests. Zoning of territory for the potential success of natural regeneration. Conceptual provisions and organizational and methodological foundations of introduction ecoadaptational restoration of forests. Agrotechnologies of adaptive restoration of forests, their characteristics and conditions of use. Features of ecoadaptational restoration of forests on the different categories of forest restoration fund.

**Forest-cultural methods to increase the productivity of forests.** Types performance. Features of regulation of endogenous and exogenous factors influencing the performance of forest communities. Forest-cultural methods to increase productivity of forest plantations (improvement of forest types of crops, fertilizer use, reconstruction of low-value plantations, creating cultures under the forest canopy, introduction of exotic species, etc.). Measures to improve the productivity of forests different purpose.

**Forest planting of green areas.** Historical aspects and modern approaches to the formation and use of suburban forests. Classification of urban and suburban green spaces. Classification of forest park landscapes. Composite principles of formation of plantations and forest park landscapes. Selection of species for plantations of different purposes. Technological features of creation of the plantation of green areas. Technological and agronomic features of formation of plantations and forest park landscapes. Silvicultural methods of improvement of hygiene properties of forest park landscapes. Selection of woody plants for the reconstruction of low value planting green areas. Forest plantations under forest canopy as a means of improving hygienic properties of suburban forests and parks.

#### ***2.5.5. Master's program "Reproduction of forests and forestry reclamation"***

**Modern technologies of seed production and nursery.** Varietal forest seed growing in Ukraine: current status, problems and prospects. Organization of a permanent forest seed base on a genetic selection basis. Normative-legal base of forest varietal seed growing. Structure, main provisions, scope and use of the Laws of Ukraine "On seeds and planting material", "On Plant Quarantine", "On Protection of Rights to Plant Varieties of Ukraine". Tree nursery Ukraine: the current state, the main problems, the main development trends and ways of improvement. Theoretical and practical basis of

vegetative reproduction of woody plants. Ways of modernizing the cultivation of seedlings in the open ground with an open root system. Growing planting material of woody plants with a closed root system. Agrotechnical features of growing seedlings in a closed ground. Features of growing large-scale ornamental seedlings. Methods of rehabilitation of lands of permanent forest nurseries.

**Industrial methods of forest growth.** Potential productivity of plantation and selection of arboreal plants. Principles of organization of raw materials plantations. Improvement of habitat terms. Regional technologies of creation of raw materials plantations of coniferous and leafy arboreal kinds. Features of creation of arboreal plants plantations of the different having a special purpose setting.

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**Forest-cultural methods to increase the productivity of forests.** Types performance. Features of regulation of endogenous and exogenous factors influencing the performance of forest communities. Forest-cultural methods to increase productivity of forest plantations (improvement of forest types of crops, fertilizer use, reconstruction of low-value plantations, creating cultures under the forest canopy, introduction of exotic species, etc.). Measures to improve the productivity of forests different purpose.

**Ecoadaptational restoration of forests.** Current approaches to restoration of forests and their importance in the context of sustainable forest management. Basic principles of ecoadaptational restoration of forests. Zoning of territory for the potential success of natural regeneration. Conceptual provisions and organizational and methodological foundations of introduction ecoadaptational restoration of forests. Agrotechnologies of adaptive restoration of forests, their characteristics and conditions of use. Features of ecoadaptational restoration of forests on the different categories of forest restoration fund.

**Systems of erosion soils control.** Rationale for zonal systems. The system measures against water erosion: organizational and economic, agronomic and agroforestry, hydraulic measures. The set of measures to combat wind erosion (deflation). Erosion in mountainous areas and measures to combat it. Features of zonal systems. Economics and Organization works to protect the soil of erosion.

**Optimization of forest-agricultural landscapes.** Crop rotations and farming systems. Land Management and agroforestry ordering. Organization of erosion area. Agroforestry plantations in the structure of FAL - types, placement, efficiency. Forest area. Principles of creation of FAL. The criterion of optimality, optimization model FAL. System of normative reference data for assessing environmental and economic efficiency of FAL.

#### ***2.2.6. Master's program "Management of forest resources and forestry business"***

**Special type of measurements and Forest inventory.** Features landscape forest inventory. Inventory of hunting grounds. Inventory of protective forest plantations. Fundamentals organize recreational and protected forests. Managing protective forest plantations. Streamlining hunting grounds. Other domestic species ordering forests. Forest management abroad.

**Forest resources management.** The purpose of the discipline "Forest resources management" is to deepen both theoretical and practical training of students in the field of forest resources management in a market economy and taking into account global environmental threats. Within the framework of the discipline the following topics are

highlighted: theoretical foundations of forest resources management (including systematic approach as a basis of decision-making, risk management in forestry, forest resource management in a crisis situation); forest resources management in the context of sustainable development and European integration of Ukraine; approaches to strategic management in forestry enterprises; forest resources management under conditions of diversification of activities of forestry enterprises.

**Forest Productivity Modeling.** Classification of models. Modeling as the main process of study of forest objects. Criteria for optimal stands. Development of regression models using modern mathematical methods. Peculiarities of development of models of dynamics and prognosis. Modeling growth functions with modern computing techniques. Planning of active experiment. Development of mathematical models using full and partial factor plans. General knowledge on numerical methods for solving optimization tasks.

**Forest Inventory and Forest Monitoring.** The theoretical basis of sampling inventory. The concept of selective enumerative and selectively measuring inventory. The size and placement of primary sampling units, the intensity of the sample. Statistical Forest Inventory. Advantages and disadvantages of sampling methods. The practice of sampling inventory in different countries. National forest inventory. The system of continuous monitoring of the forest. Monitoring of forests. Control of economic activity in the woods.

**Forestry Economics.** It envisages studying the causes of emergence of ecologically-economic and corresponding social problems, defining the goals and priorities for sustainable forest management and, in particular, forest use, justifying ecological and economic efficiency of management decisions in the field of forest use, mastering the economic evaluation of forest resources, obtaining practical skills in formation and use of forest policy tools within operation of economic mechanism of forest use.

**Foreign trade in forest sector.** The main purpose of discipline is: studying theoretical foundations in area of foreign trade in forestry sector, and to develop practical skills and ability to apply the acquired knowledge in export-import operations on enterprises of forest sector. The main areas of learning material are: legal principles of foreign trade and business activities in the forest sector, theoretical and practical bases of foreign investment in the forest sector of Ukraine and choice of organizational forms of foreign investment, issues of justification and choice of forms and methods of entering foreign markets; procedure of concluding external contracts, their features in forestry, planning, control and reporting in foreign trade in forestry.

**Information systems in forestry.** The subject aims to study main information tools for acquiring forest management information and its processing for decision-making support. Work with databases, standard office applications, network tools, database management system "Forest resources management".

### ***2.2.7. Master's program "Game management"***

**Hunting tourism and regional hunting features.** Domestic and international tourism. Ensuring the reproduction of high-yielding populations. Creating a service for hunters. Popularization of hunting trophies. Infrastructure for the stay of foreign hunters. Package tour products are designed for a different contingent of hunters. Ranching, farming from breeding hunting animals. The structure of the Ukrainian hunting industry. Users of hunting grounds. Regional features of hunting management. Regional differences in the composition of the hunting fauna. Regional protected status of hunting animals. Problems and prospects of hunting management in different regions of Ukraine.

**Zoo and reintroduction of wildlife.** Substantiation of the creation of living zoo exposures on the basis of hunting facilities. Modern technologies for keeping, breeding, displaying and preserving wildlife in ex-situ conditions. Modern technologies for the

organization and management of scientific, educational and environmental activities of zoos.

**Hunting resources and hunting products.** Inventory of hunting resources. Classification of methods and methods of hunting. Regional features of hunting economy in Ukraine. Hunting ethics. Changes of hunting fauna of Ukraine in the context of historical periods. Species composition of hunting fauna and traditions of hunting in the countries of the CIS, Eastern Europe, Asia, Africa, America, Australia. Inventory of hunting fauna. Getting and playing hunting resources.

**Innovative technologies in the hunting industry.** Possibilities of modern databases for assessing the current state and achievement of planned indicators of hunting. Programs of recultivation and melioration of hunting grounds in cooperation with forestry, agriculture and recreation activities. Newest technologies in zootechnics and scientific advances suitable for keeping and breeding hunting animals in natural and artificial conditions. Programs for raising the conditions of hunting animals by selection genetic methods and methods of cryobiology. Statistical and mathematical software packages for estimation, forecasting and modeling of hunting.

**Fundamentals of zoogeography and hunting zoning.** Patterns of geographical distribution of animals. The doctrine of the area. Zoogeographical zoning. Zoo geographic regions of the land and a brief description of their fauna. Zoogeographical characteristic of the fauna of Ukraine. Active and passive resettlement. Migration routes (historical and contemporary aspects). Zoogeographical elements of fauna and fauna complexes. Distribution of fauna of Ukraine in landscape and geographical zones. Farmland zoning of Ukraine.

**Aviary breeding and transportation of wild ratites.** Estimation, forecast and simulation of hunting management. Programs for the creation of enclosed complexes and nurseries for breeding, growing and keeping hunting animals in semi-free conditions. The technology of keeping and breeding ratites in semi-free conditions for use in hunting and for obtaining meat and trophies. Newest means of chemical immobilization of wild animals, their influence on the organism. Injection distal anesthesia of animals. Requirements for vehicles, especially their constructions

**Management of Hunting Animals.** Planning of the work of hunting farms, development of breeding plan plans, technology of management of populations of hunting animals. Development of technology for controlling the populations of hunting animals in farms of intensive and extensive types. Provision of selective removal from the population of unwanted genotypes.

**Training of masters of sciences  
branch of knowledge "Agricultural science and food"  
in specialty 206 "PARK AND GARDENING MANAGEMENT"  
in educational program "PARK AND GARDENING MANAGEMENT"**

Form of Training:	Licensed number of persons:
– Full-time	75
– Part-time	75
Duration of Training:	
– Full-time educational and professional program	1,3 years
– Part-time	1,5 years
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master of park gardening

**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.

***Master's program "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.

**Graduates employment field**

The graduates of Master's program "Landscape architecture" will be able to work as: junior research worker, planning and organization of public services engineer or specialist, landscape design specialist, park-gardening worker.

***Master's program "Landscape building"***

Foresees mastering by student's theoretical knowledge and practical skills in economic and building work on landscape objects, mastering the latest engineering

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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.

#### **Graduates employment field**

Graduates of Master's program "Landscape building" would be able to work as: junior research worker, planning and organization of public services (improvement) engineer, landscaper, green planting or laying out of parks worker, gardener.

#### ***Master's program "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.

#### **Graduates employment field**

Graduates of Master's program "Decorative Nursery" would be able to work as: junior research worker, nursery garden chief, planning and organization of public services engineer, landscaper, green planting worker, gardener.

#### ***Master's program "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.

#### **Graduates employment field**

Graduates of master's program "Ecodesign of the urban environment" would be able to work as: junior research worker, green planting master, green planting or laying out of parks worker, gardener, nursery garden chief, hothouse farm master.

#### **Practical training**

The bases of practical training, carried out during their training and practical training in the second and third semester is educational, scientific, educational and laboratories and departments of NUBiP of Ukraine.

#### **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.
4. Project of landscaping and improvement school and kindergartens territories.
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. Technological peculiarities of forcing flowering plants varieties.
9. Baroque, rococo and classicism in modern phytodesign aspect.
10. Woody plants reproduction peculiarities.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational program “Park and Gardening Management”  
(educational and professional program of master's training)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Landscape planning	1	210	7
2	Reconstruction and restoration of landscape-gardening objects	1	150	5
3	Forest-park economy	1	120	4
4	Ornamental plants protection	1	120	4
5	Exploitation of garden-park objects	1	150	5
6	Seedling, cultivar flowering plants	1	150	5
7	Computer design technologies	2	150	5
<b>Total for standard part</b>			<b>1050</b>	<b>35,0</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Business foreign language	2	120	4
2	Management in gardening	2	150	5
3	Methodology and organization of scientific research on the basics of intellectual property	1	120	4
<b>Total (Disciplines offered by University)</b>			<b>180</b>	<b>13,0</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1 Master's program “Landscape architecture”</b>				
1	Landscape design	2	120	4
2	Park studies	2	120	4
3	Ecological examination	2	120	4
4	Vertical planning of landscape objects	2	120	4
<b>Total</b>			<b>480</b>	<b>16,0</b>
<b>2.2.2. Master's program “Landscape building”</b>				
1	Vertical planning of landscape objects	2	120	4
2	Agricultural engineering in park-garden building	2	120	4
3	Phytodesign of interiors	2	120	4
4	Potted woody plants growing	2	120	4
<b>Total</b>			<b>480</b>	<b>16,0</b>
<b>2.2.3. Master's program “Ornamental Nursery”</b>				
1	Modern technologies in ornamental nursery	2	120	4
2	Potted woody plants growing	2	120	4
3	Biotechnology methods in decorative nursery	2	120	4
4	Nurseries rules and regulations	2	120	4

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>Total f</b>			<b>480</b>	<b>16,0</b>
<b>2.2.4. Master's program "Ecodesign of the urban environment"</b>				
1	Eco-technology of ornamental horticulture	2	120	4
2	Dendrorecultivation of affected landscapes	2	120	4
3	Organization and service of country-recreation	2	120	4
4	Protected park science and phytocenology	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>480</b>	<b>16,0</b>
<b>Total for elective part</b>			<b>870</b>	<b>29,0</b>
<b>3. OTHER TYPES OF TRAINING</b>				
Academic Practice			<b>60</b>	<b>2,0</b>
Production Practice			<b>540</b>	<b>18,0</b>
Preparation and defense of master's thesis			<b>180</b>	<b>6,0</b>
<b>Total</b>			<b>780</b>	<b>26,0</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90,0</b>

### Annotations of disciplines in the curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**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.** Methods of observation and entomopathological inspections, pest quantity accounts and level of pathogenicity of plant diseases pathogens, and also methods and facilities of decorative plant protection, prognostication of possible pathological changes in biocenoses, facilities of protection during the stowage of the complex systems of pest control and pathogens in corresponding 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.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

### 2.2. Disciplines offered by students

#### 2.2.1. Master's program "Landscape architecture"

**Landscape design.** Landscape design 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 studies.** The study of natural landscapes as the source material for park-building, general trends in the development of park phytocoenosis, 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.

**Ecological examination.** Environmental analysis and evaluation of pre-project, project and other materials or objects, the implementation and operation of which may have a negative impact on the state of the environment and is aimed at preparing conclusions about the compliance of the planned or ongoing activities with the norms and requirements of environmental legislation.

**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.

#### 2.2.2. Master's program "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.

**Agricultural engineering in park- garden building.** A complex of measures that solve the legal, aesthetic, organizational, economic issues, aimed at creating and maintaining high-decorative landscaping of garden and park objects of various purposes.

**Phytodesign of interiors.** As a result of studying the discipline future masters will get theoretical knowledge and practical skills interiors of various destination. In the first module, they will master the skills of phytocomposite formation, selection of plants, taking into account their biology and microclimate of the interior, as well as the style of the interior. In the second module, future masters will master the theoretical material on the arrangement of winter gardens and will acquire practical skills for the creation of floras.

**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.

### ***2.2.3. Master's program "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.

**Nurseries rules and regulations.** A legislation is in relation to a seed-growing and nursery. Normative and regulating materials in the sphere of nursery. Documents about the seed quality and planting stock quality.

### ***2.2.4. Master's program "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

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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.

**Recultivation of affected landscapes.** In a course basic information is given about factors, kinds and degree of violation of landscape structure, classification of basic forms of technogenic relief of earth surface. The program is based on modern information of theoretical and practical value, which is necessary for organization of work for recultivation of affected land and formation of phytocenosis for melioration.

**Training of masters of sciences  
branch of knowledge "Agricultural science and food"  
in specialty 187 "WOODWORKING AND FURNITURE TECHNOLOGIES"  
in educational program "WOODWORKING AND FURNITURE TECHNOLOGIES"**

Form of Training:	Licensed number of persons:
– Full-time	40
– Part-time	40
Duration of Training:	
– Full-time educational and professional program	1,3 years
– Part-time	1,5 years
Credits ECTS:	
– educational and professional program	90
Language of Teaching	Ukrainian
Qualification	Master of wood processing 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.

***Master's program "Modern woodworking technologies"***

The basis of the master's program is a systematic approach to the study of woodworking technology and forming of students' ability to use rationally the equipment, wood and energy. 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, 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**

The masters of "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, Ukrainian Research Institute of Nanobiotechnologies, government and commercial woodworking and furniture 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, senior researcher, lecturer, assistant in research and educational institutions, to participate in the international research projects.

### **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.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational program “Wood processing and furniture technologies”  
(educational and professional program of master's training)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. Name of Academic Discipline</b>				
1	Actual problems of mechanical wood processing	1	195	6,50
2	The theory and practice of mechanical wood processing	1	180	6,00
3	Theory Of Thermal Treatment Of Wood	1	180	6,00
4	Modeling and optimization of technological processes	2	150	5,00
5	Planning and design of wood products	2	255	8,50
6	Newest woodworking equipment	2	12	4
<b>Total for standard part</b>			<b>1080</b>	<b>36,0</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Forest policy	2	120	4,00
2	Methodology and organization of scientific research on the basics of intellectual property	2	120	4,00
<b>Total (Disciplines offered by University)</b>			<b>240</b>	<b>8,0</b>
<b>2.2. Disciplines offered by students</b>				
1	Planning At The Woodworking Industry	1	120	4,00
2	Ergonomics of furniture products	1	120	4,00
3	Technology Of Special Woodworking Industries	2	120	4,00
4	Foreign trade in the wood-processing enterprises	2	120	4,00
5	Mechanical and technological properties of wood	1	120	4,00
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20,0</b>
<b>Total for elective part</b>			<b>840</b>	<b>28,0</b>
<b>3. OTHER TYPES OF TRAINING</b>				
<b>Training practice</b>			<b>60</b>	<b>2,0</b>
<b>Production practice</b>			<b>540</b>	<b>18,0</b>
<b>Preparation and defense of master's thesis</b>			<b>180</b>	<b>6,0</b>
<b>Total</b>			<b>780</b>	<b>26,0</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90,0</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Actual problems of mechanical wood working.** 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.

**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.

**Theory of thermal treatment of wood.** Convective heat transfer. Similarity theory. Heat treatment of wood. Technology and equipment of the heat treatment. Heat and moisture exchange in the drying process. Aerodynamics. Equipment and technology of sheet and powdered materials drying. Alternative heat sources.

**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 optimizationstud

**Planning and design of wood products.** The purpose of discipline: professional training in the field of production of wood products and parts, as well as active engineering and design activities aimed at the manufacture of wood products, as well as the rational use of wood raw materials. The main tasks of the practical part - the development of the basics of artistic design, taking into account ergonomic requirements for wood products, mastering the basic concepts of the systematic approach to designing; the principles of structural and functional organization of new systems, techniques and means of natural, as well as dynamic and kinetic shaping in furniture design.

**Newest woodworking equipment.** Modern technical solutions in the designs of equipment for wood and wood materials processing, constructions of modern technological equipment.

## 2. Elective academic disciplines

### 2.1. Disciplines offered by University

**Forest policy.** Basic concepts of the discipline. Subject, purpose and concept of forest policy. Levels of forest policy. Basic principles of forest policy. Components of forest policy. Aims and objectives of forest policy. Conditions, goals and objectives in Ukraine. Legislation in the field of social, financial and environmental law as instruments of forest policy. Forestry legislation. Forest Code of Ukraine. Analysis of the distribution of government functions in the forestry sector in Ukraine and ways of its reform. The main functions of the state. Strategic priorities of forest policy in Ukraine. Environmental, economic and social aspects of sustainable development. Criteria and indicators of sustainable forest management. The concept of sustainable development in Ukraine. The principles of sustainable forest management. Basic concepts and definitions of certification and forest certification. Features of forest policies of European countries.

**Methodology and organization of scientific research on the basics of intellectual property.** 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.

### 2.2. Disciplines offered by students

#### 2.2.1. Master's program "Modern 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

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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.

**Ergonomics of furniture products.** Capture competences in area of forming of place of existence of man in an environment taking into account knowledge about ergonomics, and by professional competences in industry of study of basic laws of her forming; an acquaintance is with the theoretical and practical set of tools, necessary for a receipt skills of creation of a design is a project of furniture, capture of ergonomics researches basic methods; a capture ergonomics methodologies is at planning of furniture and environment. Capture of organization of creative and productive activity of collective methods taking into account ergonomics norms and requirements, by ability to pass own experience and skills on creation of artistically-industrial wares and objects on the basis of knowledge about ergonomics.

**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.

**Foreign trade in the wood-processing 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 woodworking industry.

**Mechanical and technological properties of wood.** 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.

## LAW FACULTY

**Dean** – Candidate of Science in Law, Associate professor Yara Olena Sergiivna

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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"***

Graduating department:

**Agrarian, land and environmental law named after V.Z.Yanchuk**

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E-mail: agrolaw\_chair@twin.nubip.edu.ua

Head of Department – Doctor of Law, Professor Yermolenko Volodymyr Mykhaylovych

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Head of Department – Doctor of Law, Professor Kurylo Volodymyr Ivanovych

**Civil and Economic Law**

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E-mail: civillaw\_chair@twin.nubip.edu.ua

Head of the department – Doctor of Law, Associate professor, Piddubnyi Oleksiy Yuriyovych

**Master's course  
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.

***Master's program "Agrarian Law, Land Law and Environmental Law"***

Master's 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.

***Master's program "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 government), as well as enterprises, institutions and organizations. The level of training

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and qualifications enable students to work on teaching positions in research institutes, graduates are entitled to continue postgraduate study.

### ***Master's program "International Law"***

Master's 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.

### ***Master's program "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.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Philosophy of Law	1	120	4
2	Patent law	1	120	4
3	International legal regulation of food security	1	120	4
4	Environmental policy and EU law	1	120	4
5	Problems of Information Law	1	120	4
6	Legal technique	2	120	4
7	The problems of ownership	2	120	4
8	Theoretical issues of civil law	2	120	4
9	Current issues preventing and combating corruption in Ukraine	2	120	4
10	Current problems of natural resource law	2	120	4
11	The law on environmental safety	3	120	4
12	Advisory activities of a lawyer	3	120	4
<b>Total for standard part</b>			<b>1440</b>	<b>48</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research and the principles of intellectual property	2	120	4
2	Foreign language for specific purposes	1	120	4
3	Agricultural policy	1	120	4
<b>Total (Disciplines offered by University)</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Agrarian Law, Land Law and Environmental Law"</b>				

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
1	The agrarian law of foreign countries	3	150	4
2	International and European environmental law	3	150	4
3	Legal problems acquisition and sale of land rights	3	150	4
4	The legal regulation of the land market	3	150	4
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.2. Master's program "Administrative law"</b>				
1	Administrative law and administrative responsibility	3	3	150
2	Administrative jurisdiction in the agricultural sector	3	3	150
3	Problems and consideration of criminal cases	3	3	150
4	Judicial and law enforcement agencies of modern Ukraine	3	3	150
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.3. Master's program "International Law"</b>				
1	International humanitarian law	3	3	150
2	International treaty law	3	3	150
3	Comparative constitutional law	3	3	150
4	International economic law	3	3	150
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>2.2.4. Master's program "Business Law"</b>				
1	Contract law	3	3	150
2	Problems of economic justice	3	3	150
3	Competition law	3	3	150
4	Legal protection of intellectual property rights	3	3	150
<b>Total (Disciplines offered by students)</b>			<b>600</b>	<b>20</b>
<b>Total for elective part</b>			<b>960</b>	<b>32</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Academic Practice	2	30	1
2	Production Practice	2	120	4
3	Preparation and defense of master's work	3	150	5
<b>Total</b>			<b>300</b>	<b>10</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**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.

**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.

**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 of 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.

**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.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

### 2.2. Disciplines offered by students

#### **2.2.1. Master's program "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.

### ***2.2.2. Master's program "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.

### ***2.2.3. Master's program "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 branch of international law. Internal organization of activities in the field of 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.

#### ***2.2.4. Master's program "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** - Doctor of Economics, Professor Taras O. Ievsiukov.  
Tel.: (044) 258-05-25  
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Location: building No. 6, office 219

The Faculty organizes training of Masters according to the specialty:

### **Specialty 193 “Geodesy and Land Management”**

#### ***Educational program “Geodesy and Land Management”***

Departments in charge of graduate training:

##### **Land Resources Administration Management**

Tel.: (044) 258-05-25

E-mail: Uzr\_k@ukr.net,

Head of department – Doctor of Economics, Professor O.S. Dorosh

##### **Land-use Planning**

Tel.: (044) 258-05-25

E-mail: agmartyn@gmail.com,

Head of department – Doctor of Economics, Professor A.G. Martyn

##### **Land cadastre**

Tel.: (044) 258-05-25

E-mail: v\_zayats@ukr.net

Head of department – Doctor of Economics, Professor V.M. Zayats

##### **Geodesy and Cartography**

Tel.: (044) 258-05-25

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Head of department – Doctor of geographical, Professor I.P. Kovalchuk

##### **Geoinformatics and Aerospace Research of the Earth**

Tel.: (044) 258-05-25

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Head of department – Doctor of technical, Professor S.S. Kohan

**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 ECTS
Language of teaching	Ukrainian, English
Qualification	Master of Science in Geodesy and Land Management

**The concept of training**

The concept of training for specialty 193 “Geodesy and Land Management” aimed in training highly qualified specialists in land management, land conservation, land administration, environmental monitoring of geosystems and the state land cadastre. Training involves the formation of skills and abilities that allow Master students to solve independently complex issues of land use, land development projects and planning for environmental protection, monitoring and public control over rational use and protection of land, using modern information technologies for information on land resources.

***Master’s program “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.

***Master’s program “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.

***Master's program "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.

***Master's program "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.

***Master's program "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.
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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

### Curriculum of Master training in educational program "Geodesy and Land Management" (educational and professional program of master's training)

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	State Examination of land management decisions	1	90	3
2	Agricultural, land and environmental law	1	90	3
3	Land Resources Management	1	180	9
4	Organization of land surveying works	1	90	3
5	Land Monitoring and Conservation	2	150	5
6	The legal process of land management	2	150	5
7	The land market and real estate	2	120	4
8	Design engineering	2	150	5
9	Tax system	2	90	3
10	Institutional support cadastre and real estate	3	120	4
11	Licensing and patenting of research output	3	90	3
12	Information technologies in scientific research	3	90	3
13	GIS in cadastral systems	3	90	3
14	Economics of land use and land management	3	120	4
<b>Total</b>			<b>1710</b>	<b>57</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of scientific research on the basics of intellectual property	1	90	3
2	Business foreign language	1	150	5
3	Agricultural Policy	2	90	3
<b>Total</b>			<b>330</b>	<b>11</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Land Management and Cadastre"</b>				
1	Aided design technology in land management	1	120	4
2	Territorial planning and spatial development	1	120	4
3	Quality Management of Land Management Projects	2	150	5
4	Standardization and Regulation of Land Management	3	270	9
<b>Total</b>			<b>660</b>	<b>22</b>
<b>2.2.2. Master's program "Land Conservation"</b>				

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
1	Formation of agrolandscapes	1	120	4
2	Evaluation and forecast of land quality	1	120	4
3	Engineer-technological regulation of land protection	2	150	5
4	Prediction of land use	3	270	9
<b>Total</b>			<b>660</b>	<b>22</b>
<b>2.2.3. Master's program "GIS in land management"</b>				
1	Information Modeling and programming in land management	1	120	4
2	Methods of remote sensing in land management	1	120	4
3	Geoinformation analysis and modeling	2	150	5
4	Integration of GIS, remote sensing and GNSS data	3	270	9
<b>Total</b>			<b>660</b>	<b>22</b>
<b>2.2.4. Master's program "Evaluation of Land and Property"</b>				
1	Information support of monetary evaluation of land	1	120	4
2	Registration of ownership	1	120	4
3	Cadastrers of natural resources	2	150	5
4	Real Estate Evaluation	3	270	9
<b>Total</b>			<b>660</b>	<b>22</b>
<b>2.2.5. Master's program "Geodetic-Cartographic Technologies in Land Management"</b>				
1	Computer technologies of mapping	1	120	4
2	National Spatial Data Infrastructure	1	120	4
3	Topographic, geodetic and cartographic supply of land management	2	150	5
4	Thematic mapping of land resources	3	270	9
<b>Total</b>			<b>660</b>	<b>22</b>
<b>Total for elective part</b>			<b>990</b>	<b>33</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Research and production practice	2	60	2
2	Preparation and defense of master's work	3	30	1
<b>Total</b>			<b>90</b>	<b>3</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Licensing and patenting of scientific production.** The purpose of discipline is to master knowledge in the formation of patent licensing, copyright and related rights. The ability to use knowledge for the preparation of applications for industrial property rights and patents for the protection of copyright in works of scientific and technical purposes with the requirements of national and international laws and regulations in the field of intellectual property.

**Information technology in scientific research.** Discipline involves in-depth study of organizational and methodological foundations of information technology in research work, logic and stages of information research works, sources of information, design and implementation of others.

**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.

**GIS 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.

**Institutional support cadastre and real estate.** 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.

**Land Monitoring and Conservation.** The purpose of the discipline is learning and gaining listeners required theoretical knowledge and practical skills in monitoring land.

**The 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.

**Organization of land surveying work.** 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.

**The Land market and real estate.** 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.

**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.

**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.

**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.

**Tax system.** Taxes as they are have relations to each citizen of Ukraine who pays taxes to government and also as one who get and use public goods. Beside this the relation system between entrepreneurs and government needed thorough knowledge of tax laws. The subject "Tax system" forecast acceptance of theoretical and organizational basis of tax system and tax policy, methodology of calculations, the order of payment of direct and indirect taxes by legal entities and individuals, functioning of alternative systems of taxing, work organization of supervisory authorities and tax administration.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**Methodology and organization of scientific research on the basics of intellectual property.** Research in the field of land management affects the growth of the social product. The results of scientific research in land management are an intermediate product. But their role in the organization of land relations and land use in the economy is significant. Addressing socio-economic and investment programs require training of relevant personnel of higher qualifications, which would possess methodology and methods of scientific research on problems of rational use and land conservation, land management, economics, land use and land management, new manufacturing and information technology, management and marketing in land management.

**Business foreign language.** The purpose of studying this discipline - to form students' skills and business communication skills in a foreign language at proficient user autonomous level (C1), which provides the necessary communicative competence in professional work situations orally and in writing; mastering the latest professional information through foreign sources.

**Agricultural policy.** Course objective - to 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.

### 2.2. Disciplines offered by students

#### 2.2.1 Master's program "Land management and cadastre"

**Aided design technology in land management.** The course involves studying technologies of automation of land management process, the final result of which is a set of land-use planning documentation sufficient for further formation of land plots or other land objects. We consider the practical aspects of using special software, automated data banks and peripherals.

**Territorial planning and spatial development.** The course examines the trends and patterns of settlement, organization of production, the functioning of the urban economy, social services, urban transportation systems, street and road network and their components, systems of engineering equipment and engineering site preparation, landscaping, landscape architecture. The modern urban ecology issues and resource conservation are reviewed. We study the principles of development planning, management of space resources to meet the needs of the population and the economy.

**Standardization and Regulation of 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.

**Quality Management of Land Management Projects.** 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.

### ***2.2.2 Master's program "Land Conservation"***

**Formation of agricultural landscapes.** 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.

**Prediction of land use.** 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.

**Engineer-technological regulation of land protection.** 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.

### ***2.2.3 Master's program "GIS in land management"***

**Information modeling and programming in land management.** The course provides learning basic programming skills in C++.

**Methods of remote sensing in land management.** 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, remote sensing and GNSS data.** 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.

### ***2.2.4 Master's program "Evaluation of land and property"***

**Information support of monetary evaluation of land.** The aim of the course - mastering future specialist surveyors nature of information aspects land evaluation and use of information technologies in the implementation of evaluation. Determination of the real, fair value is essential for taxation and privatization of land and property transactions about the land and rights of its lease on the secondary market. In addition, the value of

land is required for the development and implementation of investment projects, obtaining loans secured by real estate.

**Registration of ownership.** 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.

**Real Estate Evaluation.** 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.

**Cadasters of natural resources.** The content and methodological support of the discipline is aimed at developing students' knowledge and practical skills about forming database of natural resources cadasters (including water, forests, territories and objects of nature reserves, spas, etc.), their use in solving problems of local territories management and individual land use.

### ***2.2.5 Master's program "Geodetic-cartographic technology 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).

**Topographic-geodetic and mapping supply 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.

**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 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).

**Thematic mapping of land resources.** 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" "Applied Economics"***

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

##### **Entrepreneurship and agribusiness organization**

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Head of Department – Professor, Doctor of Economics Mykola Ilchuk

##### **Labour Economics and Social Development**

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##### **Global Economy**

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Head of Department – Professor, Doctor of Economics Natalia Vdovenko

### Specialties 072 "Finance, Banking and Insurance"

#### ***Educational program "Finance and Credit"***

Graduating departments:

##### **Finance**

Tel.: (044) 527 88 90

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

Head of Department – Professor, Doctor of Economics Nadiia Davidenko

##### **Fiscal policy and Insurance**

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Head of Department – Professor, Doctor of Economics Lybov Khudoliy

##### **Banking**

Tel.: (044) 527 88 90

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Head of Department – Professor, Doctor of Economics Olena Oliinyk-Dunn

## **Specialties 071 "Accounting and Taxation"**

### **Educational programs "Accounting and Audit"**

Graduating departments:

#### **Accounting and Taxation**

Tel.:(044) \_527-83-61

E-mail: oia616@ukr.net

Head of Department – Professor, Doctor of Economics, Ievheniia Kaliuga

#### **Statistics and economic analysis**

Tel.:(044) 527-82-36

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

Head of Department – Professor, Doctor of Economics Vasyl Savchuk

#### **Fiscal policy and Insurance**

Tel.:(044) 527-87-59

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

Head of Department – Professor, Doctor of Economics Lybov Khudoliy

## **Specialties 076 "Entrepreneurship, Trade and Exchange Activities"**

### **Educational program "Entrepreneurship, Trade and Exchange Activities "**

Graduating department:

#### **Entrepreneurship and agribusiness organization**

Tel.: (044) 527-86-60

E-mail: dibrova@nubip.edu.ua

Head of Department – Professor, Doctor of Economics Mykola Ilchuk

#### **Exchange activity and trade**

Tel.: (044) 527-81-31

E-mail: kaf.birhga@ukr.net

Head – PhD, Professor Nadiia Reznik

**Training of masters of sciences  
field 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
– educational and research program	120
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.

***Master's program "Business planning production activities in agriculture"***

Improved Agribusiness is an important area of economic growth in Ukraine. In agriculture continues irrational use of natural resources, labor and productive capacity. Resource efficiency depends on a large number of diverse organizational, economic, technical and financial factors, which leads to the need for real justification for each project investment of existing or newly established companies. The experience of foreign and domestic companies shows that in a stable market business success can not be achieved without making business planning. It helps distribute prioritize management efforts, rationally allocate the necessary resources and optimize the economic performance of the company. These problems need to solve economists qualifications. Their competence level of acquired knowledge on business planning of production depends on solving practical problems related to the efficiency of doing business in agricultural enterprises. "

**Areas of employment of graduates**

Managers and assistants economic departments of enterprises, associations, companies, etc. APC system.

### ***Master's program "Economy of Labor and Social Partnership"***

The purpose of the master's program "Economics of Labour and Social Partnership" is training educational degree "Master" specialty "Economics" by forming the students basic knowledge of the theory and practice of labor economics and social partnership in the agro-industrial sector of Ukraine and the professional competencies that provide highly professional staff for the national economy.

In order to form patterns of employment, economic conditions adequate new students on this master's program will learn to: 1) determine the parameters of the employment relationship, the degree of stability; the influence of trade unions; dependence of workers and employers under the specific enterprises and labor markets; 2) detect increase in the degree of commercialization of association of workers who increasingly turn to self-functioning economic actors; 3) formation of differentiated construction employment for workers with different status; 4) The monopolization and individualization of labor relations, which are caused by the emergence of a variety of professional organizations and the increasing number of career options for employees; 5) determine the significance of the growth of employment entered into by representatives of various minorities in the labor market (women, youth, the disabled, refugees, etc.).

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

Head of village councils, specialists of district and regional directorates of agriculture administration.

### ***Master's program "Agricultural Economics formations"***

Reforming the Ukrainian economy and its transition to market principles of the need to develop new areas of economic science and practice. The issue market creation at the micro level, ie at the level of the enterprise.

In these circumstances, the successful development of the agricultural sector is based on competent and competent study of market requirements, creation and production of competitive products, providing a high yield. The total sectorial approach has important advantages compared with traditional projects and programs, as increases the responsibility of the Executive in studying the problems at the regional and national levels, fully take into account aspects of sectorial policies and regulation. However, you must educate Masters sufficient standards of public accountability, which in future will form a proper institutional and administrative capacity for the formulation, implementation and coordination of common sectorial programs.

Concept and overall goal of the program reflects the objective need for increasing economic effectiveness and efficiency of the agricultural sector. Today there is a great need to train highly intelligent, educated professional of the business. Masters must learn to take the initiative and solve social and personal issues. Previously it was a system that focused only on the production, then now it becomes a system aimed at improving income and living standards of the rural population.

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

Agricultural enterprises of various forms/

### ***Master's program "Regulation of Agricultural Markets"***

The objective is the acquisition and development of the Master's program of theoretical knowledge and practical skills in economic analysis of issues that are in the interests of both individual producers of agro products and marketing managers of

agricultural firms, and analysts to assess the impact of the adoption of policy decisions in agriculture.

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

Agricultural enterprises of various forms

#### ***Master's program "Sustainable development of agribusiness enterprises in the conditions of global economic instability"***

Development of organizational, legal and economic conditions for innovative economic development of agricultural production and improve on this basis of social living of the rural population, first of all, increasing its employment and income;

- The acquisition of skills masters for the development of agricultural market infrastructure on the basis of innovation, regulation of supply and demand, quality and development of agro-industrial integration;

- Analysis of the competitive environment for the development of the agricultural sector with regard to WTO requirements, identify and support innovative processes during the implementation of priority directions of development of the agricultural sector in modern conditions;

- The study and development of measures to improve the environmental situation.

Concept Master's program provides for the formation of masters skills in drawing up business plans and integrated programs of investment and innovation development entities in the country.

Social orientation Master Program of innovative development of the agricultural sector leads to the formation of a Master approaches to overcome the negative processes and phenomena in social and economic development of agriculture and sustainable living standards of the villagers, creating conditions for the development of business and on this basis to reduce unemployment and migration.

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

Agricultural enterprises of different 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..

### **Estimated theme of master works**

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 zernoproduktov.
8. The formation and effective functioning of milk in the complex.
9. The economic mechanism of functioning of a regional stock market agricultural products.
10. Features of formation and development of the stock market agricultural products in Ukraine.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of discipline	Semester	Amount	
			hours	ECTS credits
<b>1. MANDATORY TRAINING COURSE</b>				
1	Managerial Economics	2	150	5
2	competitiveness	1	150	5
3	Modeling in management of production systems	2	120	4
4	Stock market	1	120	4
5	Project management	2	150	5
6	Business Planning entrepreneurship in agriculture	2	150	5
7	Global economy	1	150	5
8	Corporate Social Responsibility	2	150	5
9	The taxation of business entities and individuals	2	120	4
10	Economics of production	1	150	5
11	Computer technologies in accounting, tax and auditing	2	120	4
<b>Along with mandatory component</b>			<b>1530</b>	<b>51</b>
<b>2. SELECTIVE COURSES</b>				
<b>2.1. Disciplines by choice university</b>				
1	Methodology and organization of scientific research	1	120	4
2	Agricultural policy	1	150	5
3	Public Procurement	1	120	4
<b>Total elective University</b>			<b>360</b>	<b>12</b>
<b>2.2. Subjects chosen by the student</b>				
<b>2.2.1. Master's program "Business planning production activities in agriculture"</b>				
1	Design of entrepreneurship in agriculture	2	180	6
2	Agribusiness: development and evaluation	1	180	6
<b>Total student's choice</b>			<b>360</b>	<b>12</b>
<b>2.2.2. Master's program "Economy of Labor and Social Partnership"</b>				
1	Labor market	2	180	6
2	Social economy	1	180	6
<b>Total student's choice</b>			<b>360</b>	<b>12</b>
<b>2.2.3. Master's program "Agricultural Economics formations"</b>				
1	Economics of agro-industrial units	2	180	6
2	Economy specialized agricultural enterprises	1	180	6
<b>Total student's choice</b>			<b>360</b>	<b>12</b>
<b>2.2.4. Master's program "Regulation of Agricultural Markets"</b>				
1	Regulation of the market of crop production	2	180	6
2	Regulation of the market of livestock products	1	180	6
<b>Total student's choice</b>			<b>360</b>	<b>12</b>

№	Name of discipline	Semester	Amount	
			hours	ECTS credits
<b>Total for the selective component</b>			<b>720</b>	<b>24</b>
<b>3. OTHER TRAINING</b>				
1	Educational training		150	5
2	Internship		150	5
3	Preparation and defense of master's work		150	5
<b>Total</b>			<b>450</b>	<b>15</b>
<b>Total with Educational program</b>			<b>2700</b>	<b>90</b>

### Annotations subjects curriculum

#### 1. MANDATORY TRAINING COURSE

**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 skilful 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.

**The competitiveness of enterprises.** The goal of discipline is to form students 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.

**Modeling in management of production systems.** Forming students' knowledge system of the methodology and tools of modeling economic systems, forming practical skills of construction and application of mathematical methods and models of objects and processes functioning market economy, determining optimal control parameters of socio-economic systems.

**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. Course description form students with knowledge of exchange trading and operation of various types of stock market.

**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.

**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.

**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.

**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 taxation of business entities and individuals.** revealed the existing regimes of financial and business entities in various sectors of economy of Ukraine, including the peculiarities of taxation of agricultural products, construction enterprises, transport-forwarding companies, tourism, banking activities financial institutions, economic agents, non-resident, non-profit organizations (institutions) individuals. For materials developed theoretical problem for discussion and independent work.

**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.

**Computer technologies in accounting, tax and audit.** Formation of theoretical knowledge and practical skills in the field of construction and operation of information systems and computer technology in accounting. Study features roz'v'yazuvannyaoblikovyh problems in the use of computer technology of economic information; formation of skills to perform accounting standard setting objectives, develop algorithms to solve them using specialized software.

## 2. SELECTIVE COURSES

### 2.1. Disciplines by choice university

**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.

**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).

## 2.2. Subjects chosen by the student

### 2.2.1. Master's program "*Business planning production activities in agriculture*"

**Design of entrepreneurship in agriculture.** The purpose of discipline is mastering theoretical knowledge and practical skills to build a rational schemes combination in space and time of all components of the production process - labor, objects of labor and means of labor - in given conditions with the best technical and economic indicators of solving problems which put the agricultural enterprise is projected.

Tasks of the course: learning theoretical principles of design of agricultural enterprises, practical skills related to the development of technical, organizational and planning documents on which is formed and secured operation of production systems (companies).

**Agribusiness: development and evaluation.** The purpose of discipline - to lay out the basic framework for the formation and functioning of the structures of agribusiness, its specificity and the main directions of development, the need to combine market mechanism and state regulation of agribusiness.

The challenge is to uncover the essence of agribusiness as economic activity and its specificity; the role of agriculture in the food marketing system; organizational and economic conditions of effective development of agribusiness; specificity agribusiness in regions of Ukraine; regional structure of international agribusiness

### 2.2.2. Master's program "*Economy of Labor and Social Partnership*"

**Labour market.** Questions of functioning and regulation of the labor market, the development of its infrastructure, analysis of the labor market, state support employment, improving social security and fighting unemployment, development of the international labor market.

**Social Economy** purpose of the discipline "Social Economy" is to build basic knowledge of the theory and practice of social economy and the professional competence that ensure the formation of socially responsible behavior of its actors (institutions).

To determine the level of learning and the discipline rankings used sets of tests and control of individual tasks according to themes: 1. Social Economics as a science; 2. Social policy and social sphere; 3. The system of social economy; 4. Socio-cultural foundations of the economy; 5. The mechanism of socialization of the economy; 6. Social Security; 7. The role of motivation of economic activity in socialization of the economy; 8. Social factors of economic growth; 9. The mechanism of action of the social economy sector; 10. State regulation of social economy.

### 2.2.3. Master's program "*Agricultural Economics formations*"

**Economics of agro-industrial units.** 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 specialized agricultural enterprises.** Defining quantitative and qualitative parameters of the cooperative sector in the future, and basic activities through the implementation of which these parameters are met, determining the economic efficiency of the cooperative sector, the use of productive resources, the study of contemporary issues related cooperative sector.

#### ***2.2.4. Master's program "Regulation of Agricultural Markets"***

**Regulation of the market of crop production.** The state and problems of using the modern tools for regulating the crop production market in Ukraine are assessed, in particular, in the development of agricultural production institutions, the functioning of the system of prices and pricing on crop production, ensuring compliance of technical norms regarding the quality and safety of food products to international requirements. The priority measures of the state policy concerning increase of efficiency of use of tools of regulation of a market of crop production market are offered.

**Regulation of the market of livestock products.** The state and problems of the use of modern tools for regulating the market of livestock products are assessed, in particular, in the development of livestock breeding institutions, the functioning of the price system and pricing on products, ensuring compliance of technical norms regarding the quality and safety of food products to international requirements. The priority measures of the state policy on raising the efficiency of using the instruments of regulation of the livestock production market are proposed.

**Masters education  
the field of knowledge "Social and behavioral sciences"  
specialty 051 "ECONOMY"  
for the educational program "APPLIED ECONOMY"**

Form of training:	Licensed persons:
- full-time	85
- part-time	85
Training period:	
- full-time educational and professional program	1,5 age
- part-time	2 age
ECTS credits:	
- educational-professional program	90
Teaching language	Ukrainian, English
Qualification of graduates	Master of Economics

**Concept of preparation**

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.

***Master's program "Regional Economics"***

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.

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**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.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Master's Curriculum  
for the educational program "Applied Economics"  
(educational and professional training program)**

№ p/p	Designation of the discipline	Semester	Amount	
			An hour	ECTS credits
<b>1. MANDATORY EDUCATIONAL DISCIPLINES</b>				
1	Business Management	1	150	5
2	Territorial planning and development	1	150	5
3	Management of regional processes	1	150	5
4	Public relations and media design	1	150	5
5	Regional economic programs and development assistance programs	2	150	5
6	Regional development concepts	2	150	5
7	Strategies and instruments of European regional policy	2	150	5
8	Marketing and management chain value creation	2	150	5
<b>Together as a compulsory component</b>			<b>1200</b>	<b>40</b>
<b>2. SELECTIVE EDUCATIONAL DISCIPLINES</b>				
<b>2.1. Discipline at the University's Choice</b>				
1	Methodology and organization of research on the basics of intellectual property	1	90	3
2	Agrarian policy	2	120	4
<b>Total at the university's choice</b>			<b>210</b>	<b>7</b>
<b>2.2. Discipline at the student's choice</b>				
<b>2.2.1. Master's program "Regulation of Agrarian Markets"</b>				

MASTER CURRICULA AND TRAINING PROGRAMS

№ p/p	Designation of the discipline	Semester	Amount	
			An hour	ECTS credits
1.1	Entrepreneurship and organization of agribusiness in the region	1	90	3
1.1	Leadership and Human Resource Management	1	90	3
1.1	Introduction to geographic information systems	1	90	3
1.1	Smart technology	1	90	3
2.2	Social responsibility in the region	2	120	4
2.2	Applied Econometrics	2	120	4
2.2	Management of united territorial communities	2	120	4
2.2	Regional development of rural areas	2	120	4
3.3	Public Procurement	3	120	4
3.3	Public-private partnership	3	120	4
3.3	Municipal financial management	3	120	4
3.3	Management of services in rural areas	3	120	4
<b>Total student choice</b>			<b>360</b>	<b>12</b>
<b>Together as a selective component</b>			<b>690</b>	<b>23</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Educational practice		300	10
2	Internship		240	8
3	Preparation and defense of master's work		60	2
<b>Total</b>			<b>600</b>	<b>20</b>
<b>Together for the educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of curriculum disciplines**

**1. MANDATORY EDUCATIONAL DISCIPLINES**

**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.

**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.

**Management of regional processes.** Studying the components of the management systems of territories, the interrelation between them, taking into account the effect of objective economic laws, implementation in the socio-economic system of the region, based on the subsystem of regional governance.

**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.

**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, sectoral and sectoral 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.

**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.

**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.

## 2. CHOICE EDUCATIONAL DISCIPLINES

### 2.1. Discipline at the University's Choice

**Methodology and organization of research on the basics of intellectual property.** Studying the foundations of intellectual property, methods of cognition, logical organization of research on the definition of the purpose, object and subject of research, principles, approaches and directions of its conduct, the choice of means and methods by which the best result is achieved, in particular in the field of economics. The main task of the course is to train specialists of the economic profile to carry out independent research.

**Agrarian policy.** Studying the directions of development and implementation of agrarian policy, socioeconomic processes taking place in the agrarian sector, the efficiency of the use of agrarian resource potential, the economic nature and nature of the instruments for regulating the domestic and foreign markets of agri-food products, the peculiarity and main directions of the implementation of agrarian policy in Ukraine and certain foreign countries.

### 2.2. Discipline at the student's choice

**Entrepreneurship and organization of agribusiness in the region.** Studying theoretical and practical aspects of the organization of agrarian business, approaches to rationalization and designing of entrepreneurial structures in the countryside, promotes the acquisition of practical skills to substantiate design decisions, the possibilities of applying research and organizational skills in the process of developing organizational projects for writing business plans for use in the agricultural sector.

**Leadership and 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.

**Introduction to geographic information systems.** Studying the informational future of environmental management systems and modern computer technology for mapping and analysis of environmental objects, as well as real events occurring in it.

**Smart technology.** Studying ways and means for adapting to the rapidly changing conditions of modern society, independently obtaining the knowledge and skills necessary for successful work, apply them in practice, identify problems and use modern technologies, find the rational ways to solve them, be able to work with information, find and effectively use informational resources, including the world, to solve the problems, to be able to work in teams that bring together specialists from different fields and knowledge.

**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.

**Applied Econometrics.** 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.

**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.

**Regional development of rural areas.** Explores the opportunities, risks and threats to rural areas in terms of decentralization and new approaches to regional development in the country, spatial development policies for rural areas based on a territorially oriented approach, taking into account EU and OECD standards, effective management to ensure long-term and medium-term planning of the development of territories and communities, decentralization of power, development of an effective system of local self-government, approval of basic social standards, network development rhanizatsiy, mechanisms and tools that promote effective private and public institutions in rural areas.

**Public Procurement.** Studying system possibilities, implementing tenderthe 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).

**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

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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.

**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.

**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 and Credit" 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 and Credit" 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.

### ***Master's program "Banking"***

The main purpose of educational program "Banking" is training for the banking sector. Educational program provides students with the knowledge acquisition management of commercial bank on the basis of factors internal and external environment, as well as the organization of the central bank and the main directions of monetary policy. Besides training program involves studying the characteristics of banking services to entrepreneurs in the agricultural sector, due to seasonality and duration of agricultural production and the development of specialized tools required risk assessment.

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

Managers and assistants economic financial departments of agricultural enterprises, associations, managers of banks.

### ***Master's program "Risk Management and Insurance"***

The purpose of the master's program "Risk Management and Insurance" is to get the students basic knowledge of theory and practical skills in risk management and insurance as a method of risk management. The main objectives of this master's program is to ascertain the necessary features measurement and risk assessment, and application management in different types of risks in order to create an effective system to protect the interests of citizens, businesses and the state.

As a result, the study of basic sciences master's program student must know: methods to avoid risks, especially the risk diversification, methods of reducing the negative effects of risks, specific economic, investment, financial risks and risk management and be able to: identify the probability of risk, identify and assess insurance risk quantitatively measure the risk, to variation risk analysis, to determine the necessary countermeasures risks to forecast a maximum degree of probability risks and develop an intervention strategy risks.

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

Leaders, assistants, managers, insurance companies, heads of financial departments of enterprises of the agricultural sector.

### ***Master's program "Tax consulting"***

The purpose of the master's program "Tax advice" is to develop the students' key competencies for the implementation of the basic functions of tax management at the corporate level.

The main tasks of the master's program are: to provide knowledge of tax administration; formation of skills to implement the optimization of tax payments; providing knowledge about the principles of tax policy of the company; formation of skills regarding taxation of different transactions that perform entities; providing knowledge on the

implementation of financial and economic analysis for the purposes of consultation; providing knowledge of the rules of international taxation and transfer pricing.

As a result, the study of basic sciences master's program student must know: technology advisory services to individuals and legal entities; method of determining the tax base, calculation of taxes and fees, using benefits to certain taxpayers and fees; options for taxation in respect of the specific legal entities and individuals; monitor changes in the legislation; features of accounting and tax reporting; represent the interests of businesses and individuals in bodies that monitor the accrual and payment of taxes and fees, and judicial bodies.

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

Heads and specialists of economic, financial departments of companies, associations, managers, financial institutions and others.

#### ***Master's program "Corporate Finance"***

In a market economy, Ukraine efficient use of financial resources has become paramount. Rational problems entities depend primarily on the make informed financial decisions. For professionals of the financial sector is very important possession methodological tools of financial management, cash management, system analysis method of financial statements, profit management, and capital investments of intra-corporate forecasting and planning.

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

Managers and assistants economic and financial departments of companies, associations, firms serving areas APK different ownership and so on.

#### ***Master's program "Financial Analyst in business"***

The practice-oriented educational program in financial analysis is designed for young professionals wishing to gain new knowledge and skills in attracting investment and work in the financial markets, seeking to learn the techniques of financial analysts and meet best practice implementation of financial strategies of leading Ukrainian and foreign financial companies.

The goal 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 enterprises of the real sector of the economy, able to participate in the development of recommendations to improve the management of enterprises in various industries t. h. and agro.

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

CFOs, managers and analysts in commercial and investment banks, management companies, and enterprises of the real sector of the economy.

#### ***Master's program "Public Financial Management"***

Master's program "Public Financial Management" is designed with the latest trends and future directions of Ukraine's economy, active development of the financial and economic relations and increasing demand for specialists in public finances. The purpose of the master's program is to train professionals who are able to solve the basic problems of financial management at the state level, which include: improvement and development of public finance management, making qualified and scientifically based financial

management solutions in public finance and taxation; implementation and organization of financial planning at a financial institution; monitoring of industries and areas of businesses, government agencies and organizations; predictive and analytical activities through the use of modern information technologies; providing information and financial security.

### Areas of employment of graduates

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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

### Curriculum for Master in educational program "Finance and Credit" (educational and professional program of master's training)

№ n/n	Name of discipline	Semester	Amount	
			hours	ECTS credits
<b>1. MANDATORY TRAINING COURSE</b>				
1	Tax management	1	120	4
2	financial management	1	120	4
3	Financial services market	1	120	4
4	Financial econometrics	2	120	4
5	Management of financial readjustment Company	2	120	4
6	Insurance management	2	120	4
7	Budget management	2	120	4
8	Banking management	1	120	4
9	Finance Nature	2	120	4
10	Global economy	1	120	4
11	Project financing	2	120	4
12	Mortgages	2	120	4
13	Treasury	1	120	4
<b>Total with mandatory component</b>			<b>1560</b>	<b>52</b>
<b>2. SELECTIVE COURSES</b>				
<b>2.1. Disciplines by choice university</b>				
1	Methodology and organization of scientific research	1	120	4
2	Agricultural policy	2	120	4
3	Public Procurement	1	120	4
<b>Total elective University</b>			<b>360</b>	<b>12</b>
<b>2.2. Subjects chosen by the student</b>				
<b>2.2.1. Master's program "Banking"</b>				

MASTER CURRICULA AND TRAINING PROGRAMS

№ n/n	Name of discipline	Semester	Amount	
			hours	ECTS credits
1	Banking and Management	2	150	5
2	Monetary policy and the National Bank	1	150	5
<b>Total student's choice</b>			<b>300</b>	<b>10</b>
<b>2.2.2. Master's program "Risk Management and Insurance"</b>				
1	Financial support insurance liabilities	2	150	5
2	Agrarian risks and their insurance	1	150	5
<b>Total student's choice</b>			<b>300</b>	<b>10</b>
<b>2.2.3. Master's program "Corporate Finance"</b>				
1	Corporate Finance	2	150	5
2	Business Analyst	1	150	5
<b>Total student's choice</b>			<b>300</b>	<b>10</b>
<b>2.2.4. Master's program "Tax consulting"</b>				
1	International taxation	2	150	5
2	Taxation of legal entities	1	150	5
<b>Total student's choice</b>			<b>300</b>	<b>10</b>
<b>2.2.5. Master's program "Public Financial Management"</b>				
1	Financial security state	2	150	5
2	Public Debt Management	1	150	5
<b>Total student's choice</b>			<b>300</b>	<b>10</b>
<b>Total for the selective component</b>			<b>600</b>	<b>21</b>
<b>3. OTHER TRAINING</b>				
1	Educational training		150	5
2	Internship		300	10
3	Preparation and defense of master's work		150	5
<b>Total</b>			<b>600</b>	<b>20</b>
<b>Total with Educational program</b>			<b>2700</b>	<b>90</b>

### Annotations subjects curriculum

#### 1. MANDATORY TRAINING COURSE

**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.

**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.

**Financial Econometrics.** The study of economic processes (relationships) in Applied ekonometrytsi carry 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.

**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 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.

**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.

**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, 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.

**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

**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.

**Global Economy.** The purpose of the course is training 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 objective of the discipline is 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: the nature and patterns of the global economy; tools and potential anti-cyclical adjustment of global economic processes; mechanisms of global markets; modern competitive leadership strategies of global corporations; processes and models of regionalization in global economic conditions; natural, technological innovation and human resources of the global economy; civilizational dimensions of global economic processes; directions and priorities of the Ukrainian economy under globalization.

**Project financing.** purpose of discipline is to form a 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.

**Mortgages.** In the course of this discipline are considered principles of construction and operation of the system of mortgage lending in countries with developed market economies.

The purpose of discipline is to form future professionals specialized knowledge of the organization of the mortgage credit institutions and financial principles of mortgage lending in general.

Tasks of the course is mastering the features of mortgage lending and the specific functioning mortgage banks. As a result of the discipline the student must obtain the necessary knowledge of the theory and practice of mortgage lending.

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**Treasury.** The subject of discipline: financial relationships related to the formation, distribution and use of public financial resources necessary to state authorities to perform their tasks and responsibilities.

Purpose of the discipline is to expand and deepen the theoretical and practical knowledge of students on public finance management at the macro level and ensure the implementation of the State Budget of Ukraine, formation and budget execution, composition, structure and sources of appointment and role of finance in ensuring the execution of government functions authorities.

The task of discipline is to build an integrated system of knowledge about the treasury system of budget execution and the peculiarities of public finance in the modern world.

## 2. SELECTIVE COURSES

### 2.1. Disciplines by choice university

**Methodology and organization of research.** 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.

**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).

### 2.2. Subjects chosen by the student

#### 2.2.1. *Master's program "Banking"*

**Banking Management II.** Managing equity, deposit and nedopozytnym fundraising. Bank lending: Policy and equipment loans, lending businesses and individuals. Investment banking function. Features of banking services to entrepreneurs in the agricultural sector.

**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 the National Bank of Ukraine, especially its functioning and main directions of monetary policy.

### ***2.2.2. Master's program "Risk Management and Insurance"***

**Financial support insurance liabilities.** Objective: To study the economic relations between business entities for financial provision of the insurers of obligations entered into contracts of insurance, calculation of insurance rates and the formation of insurance reserves.

Subject: Economic relations arising from insurance companies in the process of insurance.

Content modules: features of the financial activities of insurance companies, the financial performance of insurance companies calculate insurance rates, are forming insurance premium funds and insurance reserves, their purpose, formation and use of financial stability and solvency of insurance operations, the criterion of evaluation.

**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.

### ***2.2.3. Master's program "Corporate Finance"***

**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.

**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.

#### **2.2.4. Master's program "Tax consulting"**

**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.

**Taxation of legal entities** purpose - formation of theoretical knowledge and practical skills of tax entities.

The subject - theoretical and practical features of taxation of business entities sectoral approach.

Content modules: aspects of taxation of business entities, the tax industry, taxation mechanism of trading activity, especially taxation of construction companies, the specifics of taxation of agricultural producers, taxation of tourism, paying taxes, financial institutions, especially the taxation of non-residents tax relief individual activities.

#### **2.2.5. Master's program "Public Financial Management"**

**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.

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.

**Public Debt Management.** In modern conditions the national debt as a result of public credit is an integral part of the financial systems of most countries of the world. The accumulation of significant public debt, increasing debt pressure on the state budget, the periodic emergence of debt crises, deteriorating conditions in global financial markets transforming the management and maintenance of public debt to one of the priorities of financial policy.

The purpose of discipline "Public Debt Management" is the formation of students' theoretical knowledge and practical skills on debt management in Ukraine and in the world.

**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 auditing 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 auditing 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 auditing 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 auditing 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.

***Master's program "Accounting, control, analysis and taxation of business entity activities"***

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.

**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.

***Master's program "Accounting and control in the public administration"***

Provides research budget organizations accounting policies; accounting and control of revenues, expenditures and cash general and special funds of budgetary organizations; features reporting of budget organizations; features accounting and control of property, stocks, funds and accounts; use of computer technology in the accounting and budgetary control organizations.

**Areas of employment of graduates**

Chief accountant, deputy chief accountant, accountant (specialist with a diploma) in budgetary institutions.

***Master's program "Strategic accounting and business and social analytics"***

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) of agricultural enterprise, researcher (information analyst), accounting analyst, analyst of consolidated information, analyst of lending.

***Master's program "Accounting and control support for economic security management"***

Provides accounting and control studies in the system of economic security management of the enterprise and directions of epyшк reform, the organization of economic control with the use of computer technology, the method of its implementation, organization and control of the method: fixed assets, stocks, funds and payments, equity, long-term and current obligations' liabilities, costs and revenues, financial results; organization and methodology of internal control, including inventory; documenting the

results of audits and inspections; implementation of audit and inspection of materials and order pecuniary damage.

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

The auditor, assistant of auditor, senior accountant-auditor, accountant-auditor of the first category, accountant-auditor of the second category, accountant-auditor in agricultural enterprises

### **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"; PJSC CB "PrivatBank"; 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.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	hours
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Global economy	1	90	4
2	Tax management	1	120	4
3	Accounting in business management	1	120	4
4	Financial analysis	1	120	4
5	Accounting organization	1	120	4
6	The organization and methodology of the audit	2	120	4
7	Strategic analysis in enterprise management	2	90	4
8	Applied econometrics	2	90	4
<b>Total for standard part</b>			<b>960</b>	<b>32</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of research	1	120	4
3	Agrarian policy	1	120	4
2	Public Procurement	1	120	4
<b>Total (Disciplines offered by University)</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program " Accounting, control, analysis and taxation of business entity activities "</b>				
1	Internal control of agricultural units' activity	2	120	4
2	Professional ethics of accountants and auditors	2	120	4
3	Accounting and reporting for small business	2	120	4
4	Forensic economic examination	2	120	4
5	Accounting and financial reporting by international standards	2	120	4
6	Accounting of FEA	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.2. Master's program " Accounting and control in the public administration "</b>				
1	Control of public sector institutions	2	120	4
2	Analysis of public sector institutions	2	120	4
3	Professional ethics of accountants and auditors	2	120	4
4	Forensic economic examination	2	120	4
5	Electronic document management	2	120	4
6	Reporting in public sector institutions	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.3. Master's program "Strategic accounting and business and social analytics"</b>				
1	Strategic Management Accounting	2	120	4
2	Data mining	2	120	4
3	Professional ethics of accountants and auditors	2	120	4
4	Sector and Institutional analysis	2	120	4
5	Accounting and financial reporting according to international standards	2	120	4
6	Business social analysis	2	120	4
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>2.2.4. Master's program " Accounting and control support for economic security management"</b>				
1	Accounting and financial reporting according to international standards	2	120	4
2	Professional ethics of accountants and auditors	2	120	4
3	Internal control of agricultural units' activity	2	120	4
4	Forensic economic examination	2	120	4
5	Information systems in economic security management	2	120	4
6	Analytical support for economic security management	2	120	4

№	Name of Academic Discipline	Semester	Number	
			hours	hours
<b>Total (Disciplines offered by students)</b>			<b>720</b>	<b>24</b>
<b>Total for elective part</b>			<b>870</b>	<b>29</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical training	3	480	16
2	Preparation and defense of master's work	3	180	6
<b>Total</b>			<b>660</b>	<b>22</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Annotations for educational plan disciplines

#### 1. STANDARD ACADEMIC DISCIPLINES

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

**Global economy.** Forming students' understanding of the conditions and factors of development, mechanisms and tools of the global economy, study of market relations among the global economic system, awareness of its intellectual mission for balanced decision-making in the general context of civilized progress.

**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 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.

**Applied Econometrics.** The development of mathematical - statistical tools of econometrics, consisting of sections: classical linear model multiple regression and classical least squares; generalized linear model multiple regression and generalized least squares; models and methods of statistical analysis; time series and forecasting; system of structural equations.

#### 2. ELECTIVE ACADEMIC DISCIPLINES

##### 2.1. Disciplines offered by University

**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.

**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.

## 2.2. Disciplines offered by students

### ***2.2.1. Master's program " Accounting, control, analysis and taxation of business entity activities "***

**Internal control of agricultural units' activity.** Control of financial and business control equity and liabilities, control of revenues, expenditures and financial results.

**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.

**Accounting and reporting for small business.** Forms of small businesses and job and organization of accounting for them. Accounting for a private entrepreneur. Chart of accounts and accounting in the form of small businesses. Accounting for funds and accounts. Accounting for inventory and fixed assets. Accounting for production, sales and financial results. Preparation and submission of financial and tax reporting.

**Forensic economic 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.

**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 of FEA.** Subject, tasks and content of the discipline. External contracts display information and features in the accounting system. Accounting for exports. Accounting for imports. Accounting barter and tolling operations. Accounting for investment transactions. Accounting for currency and financial transactions. Accounting transactions in enterprises with foreign investments.

### **2.2.2. Master's program "Accounting and control in the public administration"**

**Control of public sector institutions.** Organization of internal controls in budget institutions. Internal control performance of budgetary institutions.

**Analysis of public sector institutions.** Formation of knowledge on methods of studying and evaluating the performance of budgetary institutions. Study methods and analysis organization based on the financial statements of budgetary institutions. Methods for comprehensive evaluation of the financial condition of budgetary institutions for solving economic problems.

**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.

**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.

**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.

**Reporting in public sector institutions.** The concept of reporting of budget institutions. Lines of reporting of budget institutions. Structure and content of certain types of reporting. Tax reporting. Statistical and special reports.

### **2.2.3. Master's program "Strategic accounting and business and social analytics"**

**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.

**Data mining.** Learning concepts, approaches and criteria, and comparison study of alternative solutions and projects based on a systematic approach in conditions most efficient use of available resources.

**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.

**Sector and Institutional analysis.** The term "System of National Accounts" (SNA). Research subject SNA. Basic principles of the SNA. The transition to international statistical methodology and its purpose, integrating SNA different countries, the goal of creating SNA Ukraine. SNA role in the social economic statistics. InfoBase SNA in Ukraine: the use of continuous, selective and special surveys. SNA role as the only international standard accounting and analytical systems. Types and structure of economic classifications in the SNA.

**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 certain business transactions.

**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.

#### ***2.2.4. Master's program "Accounting and control support for economic security management"***

**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.

**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.

**Internal control of agricultural units' activity.** Control of financial and business control equity and liabilities, control of revenues, expenditures and financial results.

**Forensic economic 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.

**Information systems in economic security management.** Систематизація та формування знань щодо створення та управління інформаційними системами в контексті забезпечення економічної безпеки підприємства, вивчення принципів забезпечення економічної безпеки підприємства; формування вмінь оцінювати рівень безпеки функціональних складових економічної системи підприємства, розробляти концепції інформаційних систем, готувати програми їх реалізації

**Analytical support for economic security management.** The purpose of the discipline is to teach students to substantiate theoretical positions and to develop practical recommendations on analytical support for improving the economic security of enterprises through the adoption of managerial decisions aimed at ensuring the economic interests of enterprises at all levels of their economic relations from the impact of internal and external threats.

**Training of masters of sciences  
field of knowledge "Management and Administration"  
in specialty 076 "BUSINESS, TRADE and EXCHANGE ACTIVITIES"  
in educational program "BUSINESS, 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, Trade and Exchange Activities

**Concept of training**

Fundamentality training in the educational and professional program "Business, 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.

***Master's program "Development of entrepreneurship and agribusiness"***

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.

**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.

***Master's program "Stock exchange activities"***

Lets prepare professionals who through effective use of the exchange market will minimize both productive and financial risks practically all spheres of economic activity.

**Areas of employment of graduates**

Employees of brokerage firms, dealing centers, investment companies and funds, asset management companies.

***Master's program "Commercial activity and trade"***

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**

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.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational program "Entrepreneurship, Trade and Exchange Activities"  
(educational and professional program of master's training)**

№	Name of Academic Discipline	Semester	Number	
			hours	hours
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Business Planning entrepreneurship in agriculture	1	120	4
2	Exchange market	1	150	5
3	Pricing in the exchange market	1	120	4
4	Analysis and forecasting the stock market	1	120	4
5	Competitiveness business structures	1	120	4
6	Business project management	2	120	4
7	International stock markets	2	120	4
8	E-Business	2	120	4
9	Комерційна діяльність	2	120	4
<b>Total for standard part</b>			<b>1110</b>	<b>37</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Methodology and organization of research	1	120	4
2	Public Procurement and Exchange E-trade	2	120	4
3	Agrarian policy	2	120	4
<b>Total (Disciplines offered by University)</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Development of entrepreneurship and agribusiness "</b>				
1	Strategy for the development of entrepreneurship and agribusiness	2	150	5
2	Planning of entrepreneurial activity in agroindustrial complex	2	150	5
3	Entrepreneurship in the field of processing of agricultural products	2	150	5
<b>Total (Disciplines offered by students)</b>			<b>450</b>	<b>15</b>
<b>2.2.2. Master's program "Stock exchange activities"</b>				
1	Hedging futures and options	2	150	5
2	Trade stock tools	2	150	5
3	Clearing and settlement activities	2	150	5
<b>Total (Disciplines offered by students)</b>			<b>450</b>	<b>15</b>
<b>2.2.3. Master's program "Commercial activity and trade"</b>				
1	Trading strategies	2	150	5
2	Commercial activities	2	150	5
3	Simulations on the market	2	150	5
<b>Total (Disciplines offered by students)</b>			<b>450</b>	<b>15</b>

№	Name of Academic Discipline	Semester	Number	
			hours	hours
<b>Total for elective part</b>			<b>720</b>	<b>24</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Practical training	3	480	16
2	Preparation and defense of master's work	3	420	14
<b>Total</b>			<b>900</b>	<b>30</b>
<b>Total for Educational program</b>			<b>2700</b>	<b>90</b>

### Annotations educational plan disciplines

#### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**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.

**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 activity.** The essence and main tasks of business and its legal framework, privatization of basic legal forms of management. Development proposals for rationalizing the management of trade problems further increase the efficiency of processes and customer service.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**Public Procurement and Exchange E-trade.** 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. 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.

**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.

## 2.2. Disciplines offered by students

### **2.2.1. Master's program "Development of entrepreneurship and agribusiness"**

**Strategy for the development of entrepreneurship and agribusiness.** The purpose of the discipline is to study the theoretical foundations of strategic planning, mastery of skills and tools of strategic analysis and the formation of strategies of entrepreneurial structures in the field of agribusiness. The subject of studying the discipline is the processes of developing strategies for entrepreneurial agribusiness structures, analytical substantiation and the choice of strategic alternatives to their development.

**Planning of entrepreneurial activity in agroindustrial complex.** The purpose of the discipline is the formation of a system of knowledge of the methodology of planning entrepreneurship and control of project implementation. The subject of study of discipline is the processes of elaboration of projects of activity of business structures, which are carried out with application of specific methods and tools for ensuring the target parameters of the project.

**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.

### **2.2.2. Master's program "Stock exchange activities"**

**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.

**Trade derivatives instruments.** The subject of discipline is the organization and regulation of securities trading on the stock market. Program courses include: securities on the stock market of Ukraine; securities traders and other participants of trading on the stock market; financial monitoring and financial calculations on the securities market. Aim of the course - the study of the process of trading in the stock the stock market.

**Clearing and settlement activities.** The course examines the activities of market participants to determine the mutual obligations under the contracts. The course involves the study of the clearing, its technological support, the rights and obligations of the participants. Students get practical skills calculations for a large number of agreements concluded, and with a significant number of contractors.

### **2.2.3. Master's program "Commercial activity and trade"**

**Trading Strategies.** The aim of this course is to reveal elements of behavior on the market, its pricing strategy as the procurement of resources and the implementation of production. Attention is drawn to the fact that enterprises in developed countries in addition to its core activities, tend to get more and investment income, requiring the study of behavior on the stock market.

**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.

**Simulations on the market.** Discipline is merely applied aspect, which is the scenario conditions for the development of various situations that may arise in the market. Students learn to develop measures to address them, picking up a variety of economic instruments. Particular attention is paid to the possibility of reducing the negative effects of adverse situations with opportunities exchange market.

## 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 413, 525, 625

Faculty (ERI) organizes and coordinates educational process of master training in educational programs within specialties:

### **Specialty 075 "Marketing"**

#### ***Educational program "Marketing"***

The graduating department:

#### **Marketing and International Trade**

Tel .: (044) 527-89-78

E-mail: market\_chair@nubip.edu.ua

Head - Doctor of Economics, professor Yaroslava Larina

### **Specialty 073 "Management"**

#### ***Educational program "Management of organizations and administration"***

The graduating department:

#### **Management named after professor Yo.S. Zavadsky**

Tel .: (044) 527-84-80

E-mail: manag@nubip.edu.ua

Head - Doctor of Economics, Professor Vasyl Horiovyi

#### ***Educational program "Management of foreign economic activity"***

The graduating department:

#### **Administrative Management and Foreign Economic Activity**

Tel .: (044) 527-86-51

E-mail: worldagro\_chair@nubip.edu.ua

Head - Doctor of Economics, professor Valerii Halushko

#### ***Educational program "Administrative Management"***

The graduating department:

#### **Administrative Management and Foreign Economic Activity**

Tel .: (044) 527-86-51

E-mail: worldagro\_chair@nubip.edu.ua

Head - Doctor of Economics, professor Valerii Halushko

#### ***Educational program "Management of investment activity and international projects"***

The graduating department:

#### **Production and investment management**

Tel.: (044) 527-80-80

E-mail: proinvestman@nubip.edu.ua

Head of Department – Corresponding Member of the National Academy of Sciences of Ukraine, Professor, Doctor of Economics Shynkaruk Lidia

**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
– educational and research program	120
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.

***Master’s program "Logistics"***

The aim of the master’s program 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.

**Areas of employment for graduates**

Logistics companies and logistics divisions of large enterprises.

***Master’s program "Advertising business"***

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.

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### ***Master's program "Marketing and business activity"***

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.

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

Businesses and organizations engaged in intermediary activity; marketing and sales departments of enterprises of different organizational and economic forms.

### ***Master's program "International trade"***

Specialists learn to analyze market conditions in a globalizing world economic environment, develop and evaluate the economic efficiency of international commercial transactions, apply marketing principles in international trade. The program aims to train specialists in international trade, able to perform the respective functions of trade on foreign markets, promote the effective promotion of products, introduce new organizational and economic technologies in the field of international trade.

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

Marketing departments of international companies and joint ventures.

#### **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. Organization of marketing research on milk and dairy products market.

#### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);

3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2017;

4) by concurrent full-time study in related specialty (see item 1) and part-time study (see items 2);

5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Social responsibility	1	120	4
2	Strategic Marketing	1	120	4
3	Logistics management	1	120	4
4	Advertising management	2	120	4
5	Marketing Management	2	120	4
6	Forecasting methods in marketing research	1	120	4
7	Commercial activity of intermediary enterprises	1	120	4
8	Marketing planning	2	120	4
9	Management of enterprise competitiveness	1	120	4
<b>Total standard part</b>			<b>1080</b>	<b>36</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by the university</b>				
1	Agricultural policy	1	120	4
2	Methodology and organization of scientific research with the principles of intellectual property	1	90	3
3	Business foreign language	1	150	5
<b>Total part offered by the university</b>			<b>360</b>	<b>12</b>
<b>2.2. Discipline chosen by a student</b>				
<b>2.2.1. Free chose disciplines</b>				
1.	Global economy	2	90	3
2.	Financial management	2	90	3
3.	Human resources management	2	90	3
4.	International Management	2	90	3
5.	Product Innovation Policy	2	90	3
6.	Psychology of management and conflict management	2	90	3
7.	Business protocol and negotiating	2	90	3
8.	Internet Marketing	2	90	3
9.	Stock market	2	90	3
10.	Brand Management	2	90	3
11.	Speachwriting	2	90	3
12.	Technology of presentations and web-design	2	90	3
13.	Project Management	2	90	3
<b>Total part free chose</b>			<b>270</b>	<b>9</b>
<b>2.2.2.1 Master's program "Logistics"</b>				
1	International trade and world markets conjuncture	2	120	4
2	Mathematical models in logistics	2	120	4
3	Logistics in FEA	2	120	4
4	Transport Logistics	2	120	4
<b>Total part of master's program</b>			<b>540</b>	<b>16</b>
<b>2.2.2.2. Master's program "International trade"</b>				
1	Marketing research of foreign markets	2	120	4

MASTER CURRICULA AND TRAINING PROGRAMS

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
2	International trade and world markets conjuncture	2	120	4
3	Logistics in FEA	2	120	4
4	International Business Transactions	2	120	4
<b>Total part of master's program</b>			<b>540</b>	<b>16</b>
<b>2.2.2.3. Master's program "Marketing and business activity"</b>				
1	Electronic commerce	2	120	4
2	Merchandising	2	120	4
3	Direct sale technology	2	120	4
4	Retailing technology	2	120	4
<b>Total part of master's program</b>			<b>540</b>	<b>16</b>
<b>2.2.2.4. Master's program "Advertising business"</b>				
1	Advertising projects management	2	120	4
2	Graphic design	2	120	4
3	Creativity in advertising	2	120	4
4	Psychology of Advertising	2	120	4
<b>Total part of master's program</b>			<b>540</b>	<b>16</b>
<b>Total part chosen by a student</b>			<b>750</b>	<b>25</b>
<b>Total elective part</b>			<b>1110</b>	<b>37</b>
<b>3. OTHER FORMS OF TRAINING</b>				
1	Production and pre-diploma practice	2,3	240	8
2	Writing and defense of master thesis		270	9
<b>Total</b>			<b>510</b>	<b>17</b>
<b>Total in educational program</b>			<b>2700</b>	<b>90</b>

**Annotation of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Social responsibility.** The aim of the discipline: to form students' fundamental knowledge of the theory and practice of social responsibility and appropriate professional competences.

**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.

**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.

**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.

**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.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by university

**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-

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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.

**Business foreign language.** The overall objective of the program of foreign language teaching for specific purposes is to develop students' professional language competences that will contribute to their effective functioning in diverse cultural, educational and professional environment.

## 2.2. Disciplines chosen by a student

### 2.2.1. *Free chose disciplines*

**Global economy.** The aim of the discipline: to form students' understanding of the conditions and factors of development, mechanisms and tools of the global economy, awareness of their intellectual mission for efficient decision-making in the context of civilization progress.

**Financial management.** The aim of the discipline is to develop student modern economic thinking and the system of expertise knowledge in the field of finance management, practical skills of their application in various areas of financial activity.

**Human resources management.** The aim of the discipline is to form complex theoretical knowledge and practical skills of developing and implementing HR policy in modern organizations, rational selection of employees for positions and efficient teambuilding, performance evaluation, development and use of employees' potential.

**International Management.** The discipline studies world practice in management trends. Students examine management systems in different countries, compare and evaluate them from the position of their application in Ukraine.

**Product innovation policy.** The aim of the discipline is to develop a system of knowledge about the main directions in the strategic planning of the innovation process to create commercially profitable products. The main objectives of the discipline are to introduce students to the principles of product innovation marketing; effective application of research results to create competitive products; skills of using modern methods and techniques to generate ideas; functional and economic substantiations of conformity of new products to market requirements.

**Psychology of management and conflict management.** The aim of the discipline is to study the general laws, mechanisms of formation and development of cognitive mental processes, properties, states and formations in the process of management, under stress and conflict. The objective of the course is to form the system of theoretical and methodological knowledge on the problems of psychological science and practice, knowledge of the structural elements of the psyche - mental cognitive processes, properties, states and formations at the level of representation and interpretation for practical application and implementation in the professional activity of future managers.

**Business protocol and negotiating.** The discipline studies modern management requirements, in particular, business protocol and ethics as its important component, enterprise responsibility as the first step towards ethical conduct, preparation for negotiations, negotiating (the main stages and their characteristics), methods of negotiating, negotiation styles, analysis of the results of negotiations and implementation of the agreements, rules and regulations of business meetings, highlights of meeting arrangements, preparation of venues and meeting of delegations.

**Internet Marketing.** The purpose of teaching the discipline is to form a knowledge of the future specialists of the basics of modern Internet marketing, gaining competencies in organizing and conducting Internet marketing activities, assessing their effectiveness. To achieve the goal the tasks of mastering the basic methods and technologies of promotion of products (services) on the Internet are set; effective use of the most popular Internet marketing technologies.

**Stock market.** The discipline gives students an idea of the basic tools of trade used in the global stock market. The marketing experts study the process of product pricing on the stock market and explore the factors affecting it.

**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.

**Speechwriting.** The purpose of the discipline is to form students basic ideas about the analysis and algorithms of modeling speeches in the activities of a marketer, speaker, PR-specialist in state and public organizations. Tasks of the discipline: to teach to apply analytical schemes of research of verbal and non-verbal communications, which are necessary for understanding of political strategies of influence of various subjects of international relations; to provide the necessary knowledge in the field of technologies of rhetorical influence on different subjects; To form integral theoretical representations about the conditions of linguistic manipulation of listeners' behavior; Teach students to use adequate means of verbal and non-verbal communication modeling in marketing, PR-practices, branding, advertising, etc.

**Technology of presentations and web-design.** The purpose of teaching is to prepare students for presentations, reports in front of the staff at various levels, training and teaching methods of designing websites in order to bring their ideas to the audience / consumer. The objective of discipline is learning the methods for creating presentations and websites, acquaintance with the basics of building a report.

**Projects Management** provides knowledge of planning, organizing and managing resources for the successful completion of the objectives and tasks of a project. The main objective is: acquisition of skills to achieve the objectives and tasks of the project, adhering to the obligations of the predefined project constraints. Typical constraints are the scope and content of the project, the time, and budget. The minor though more ambitious objectives are: optimization, distribution and integration of tasks to achieve the predetermined goals.

#### ***2.2.2.1. Master's program "Logistics"***

**International trade and world market conjuncture.** The aim of the discipline is to develop students' knowledge and skills in the theory and methodology of conjuncture analysis and forecasting of marketing research of global commodity markets. The subject of discipline is theoretical and practical basis of organization of conjuncture research of changes in the conditions of world commodity markets by business entities. The program of the course includes two modules: the theoretical basis of conjuncture research in international trade; conjuncture research of world commodity markets.

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**Mathematical models in logistics.** The aim of the discipline is to develop students' mathematical knowledge to solve problems in professional activities, analytical thinking skills and mathematical formulation of economic problems in management.

**Logistics in FEA.** The subject of the discipline is the general laws of development of logistics systems, characteristics and trends of management and optimization of material flows in foreign economic activity. The aim of the discipline is to form systemic knowledge of the conceptual bases of logistics, theory and practice of this direction and skills of independent work regarding up-to-date methods of managing material and other flows in modern conditions. The task of discipline is to provide students with deep theoretical knowledge on concepts, strategies and tactics in logistics; master methodological tools of development and implementation of logistics tasks; master the skills of logistics thinking and develop proposals on improving logistical systems and mechanisms of their functioning; skills of economic performance evaluation and the effects of logistics solutions in foreign economic activity.

**Transport logistics.** The discipline deals with characteristics of the global market of transportation and logistics services, transport and logistics strategy of the European Union, the problems of transport logistics, the choice of vehicle, drawing up routes, transport tariffs and fines, cargo transport characteristics, scheduling transportation. The aim of the discipline is to provide students with knowledge and skills regarding the components of modern transport logistics systems. The task of the discipline is to form students' competence in developing transport logistics in Ukraine.

#### ***2.2.2.2. Master's program "International trade"***

**Marketing research of foreign markets.** The aim of the discipline is to develop students' knowledge and skills in the theory and methodology of marketing research of macro- and micro foreign market environment. The subject of the discipline is theoretical and practical basis of the organization of marketing research of foreign markets by business entities in order to assess changes in the conditions of world commodity markets and justification of effective management decisions. The program of the discipline includes two modules: the theoretical principles of marketing research of foreign markets; research of competitors and consumers in foreign markets.

**International trade and world market conjuncture.** The aim of the discipline is to develop students' knowledge and skills in the theory and methodology of conjuncture analysis and forecasting of marketing research of global commodity markets. The subject of discipline is theoretical and practical basis of organization of conjuncture research of changes in the conditions of world commodity markets by business entities. The program of the course includes two modules: the theoretical basis of conjuncture research in international trade; conjuncture research of world commodity markets.

**Logistics in FEA.** The subject of the discipline is the general laws of development of logistics systems, characteristics and trends of management and optimization of material flows in foreign economic activity. The aim of the discipline is to form systemic knowledge of the conceptual bases of logistics, theory and practice of this direction and skills of independent work regarding up-to-date methods of managing material and other flows in modern conditions. The task of discipline is to provide students with deep theoretical knowledge on concepts, strategies and tactics in logistics; master methodological tools of development and implementation of logistics tasks; master the skills of logistics thinking and develop proposals on improving logistical systems and mechanisms of their functioning; skills of economic performance evaluation and the effects of logistics solutions in foreign economic activity.

**International Business Transactions.** The aim of the course is to provide students with knowledge about preparation, conclusion and implementation of international commercial transactions based on the most important sources of legal regulation of international business developed by UNECE, UNIDROIT, UNCITRAL, ICC and business associations, as well as forms and methods of international commercial payments. The objectives of the discipline is to introduce students to the essence of international commercial agreements, principles of international agreements taken into account when drawing up contracts and simplification of procedures in international business; the use of practical skills to draw up contracts for the international sale of raw materials and manufactured goods, contracts in countertrade transactions, brokering, licensing, franchising, engineering, leasing, factoring services and production maintenance service; provide students with practical knowledge about methods of payment, their strengths and weaknesses, as well as international payment systems.

### ***2.2.2.3. Master's program "Marketing and business activity"***

**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.

**Direct sale technology.** 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.

**Retailing technology.** 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 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.

### ***2.2.2.4. Master's program "Advertising business "***

**Advertising project management.** The discipline provides training in planning and managing advertising projects, particularly in the following areas: project environment affecting the project (internal and external factors), project drafting – setting goals,

objectives and strategies of the project, project planning – the system of measures for the project, technical performance – direct technical execution of project plan points, project management – monitoring of project implementation according to plan.

**Graphic design.** The purpose of teaching this discipline is to build students' competencies in the design of printing editions and multimedia products in accordance with the principles of graphic design and usability. In order to achieve this goal, the following main tasks have been set within the discipline: students' knowledge of the principles of graphic design, including the design of printed publications (posters, booklets and multi-page editions) and multimedia products (web-sites and multimedia presentations); Formation of competences for students to create graphic compositions by means of Adobe Illustrator; development in students of figurative thinking and creativity.

**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.

**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	60
Duration of training	
– full-time educational and professional program	1,5 year
– full-time educational and research program	2 years
– part-time	1,5 year
Credits ECTS:	
– educational and professional program	90
– educational and research program	120
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 main task of training in management of organizations and administration is to teach masters to make their own decisions, to carry out scientific research activities in the relevant areas and to give practical recommendations on the current problems in the agro-industrial sector: development and implementation of economic policy, planning, forecasting, economic-organizational and research functions necessary for organization and rational use of material and technical potential of AIC entities; improvement of the efficiency and reliability of management, introduction of new progressive organizational forms; improvement of methodology of economic analysis, investment forecasting, elaboration of business-plans and justification of managerial decisions; appropriate practical application of the provisions of the legislation of Ukraine on the issues of financing, crediting and taxation of enterprises, institutions and organizations of the agro industrial complex.

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

***Master's program "Management of enterprise strategic development"***

Training of specialists for management and peopleware in large business groups and associations of integrated services of organizational and strategic development, the activity of which involves comprehensive diagnostics of the organizational systems, implementation of innovative approaches through proactive crisis management system by means of establishing effective institutional mechanism to ensure functioning of the subjects of corporate interaction.

**Areas of employment for graduates**

Managers of the structural divisions of enterprises in the agrarian sphere.

***Master's program "Management on the market of goods and services"***

Training of specialists for management of various organizations on the market, including the market infrastructure entities by creating competitive advantages of

organizations and their products. Future masters obtain theoretical and practical skills in enhancing competitiveness of a specific product or services through the system of organizational measures, including motivation.

**Areas of employment for graduates**

Managers of the structural divisions of enterprises in the agrarian sphere.

***Master's program "Quality Management"***

The program trains specialists for developing the quality management system considering the objectives and policies in the information management of product quality, methods and analysis of quality indicators, improvement of the processes of quality assurance system functioning. Graduates will be able to improve the efficiency of economic activities by using modern approaches to management based on the quality management criteria as well as quality of the products and services offered by an enterprise or organization.

**Areas of employment for graduates**

Managers of the structural divisions of enterprises in the agrarian sphere.

***Master's program "Management of cooperative groups"***

The study of theoretical aspects of managing various activities of co-operative forms in accordance with the needs of the national economy. The programme provides students with knowledge, skills and competences in planning, motivation, control, organization and coordination of a cooperative enterprise; effective decision-making in accordance with cooperative principles; planning needs in different types of resources and coordination of their use by the members of the cooperative; drawing up business plans; organization of collective work; coordination of team work and conflict management; introducing transparent relations; regulation of service processes; understanding the basic needs of cooperative members, customers, introducing the strategy of promoting new products and services through cooperatives; formation and development of organizational culture and consulting activities.

**Areas of employment for graduates**

Managers of the structural divisions of enterprises of cooperative integrated type.

**Educational and research program of master's training further includes:**

training of specialists of issues of formation and functioning of the system of management of the economic entities on the market of goods and services to provide effective responses to the needs of consumers using innovative approaches in management. Graduates will be able to apply the appropriate scientific methods of analysis and choice of optimal managerial decisions, to develop their own proposals and improve the existing approaches to the management on the market of goods and services.

**Areas of employment for graduates**

Post-graduate courses, organization of consulting services in the sphere of management.

**Practical training**

The future masters in management will be able to apply modern methods of management, will acquire knowledge of technological issues of enterprise functioning and

the ability of self-control; clear personal goal-setting, problem-solving skills; ability to innovate; to influence others; knowledge of modern management approaches; ability to manage; ability to train and develop subordinates, manage an enterprise, knowledge of practical aspects of decision-making.

### Proposed Topics for Master Theses

1. Improvement of the system of labor potential management of an enterprise.
2. Improvement of the system of manager's performance and evaluation of personal managerial qualities.
3. Management of entrepreneurial activity and ways of its improvement.
4. Improvement of organization and motivation of labor at the enterprise.
5. Improvement of the management system in the sector of animal husbandry.
6. Development of communications system in enterprise management.
7. Improvement of the process of adoption and implementation of managerial decisions.
8. Formation of enterprise competitive strategies.
9. Formation of quality management system of enterprise in agro industrial complex.
10. Development of the strategy of HR management at an enterprise.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2017;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

### Curriculum of Master training in educational program "Management of organizations and administration" (educational and professional program of master's training)

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Business Management	1	150	5
2	Psychology of management and conflict management	1	120	4
3	Contract law	1	120	4
4	Management of enterprise competitiveness	1	150	5
5	Corporate management	2	150	5
6	Project management in organization	2	120	4
7	Quality management	2	120	4
8	Change management	2	120	4
9	Business ethics and corporate social responsibility	2	150	5
<b>Total standard part</b>			<b>1200</b>	<b>40</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by the university</b>				
1	Agricultural policy	1	120	4
2	Methodology and organization of scientific research with the principles of intellectual property	1	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
<b>Total part offered by the university</b>			<b>240</b>	<b>8</b>
<b>2.2. Disciplines chosen by a student</b>				
<b>2.2.1 Free chose disciplines</b>				
1	Management of enterprise strategic development	3	120	4
2	Investment management	2	120	4
3	Risk and economic security management	3	120	4
4	Marketing management	2	120	4
5	Information systems and technologies in organization management	2	120	4
<b>Total part free chose</b>			<b>120</b>	<b>4</b>
<b>2.2.2.1. Master's program "Management on the market of goods and services"</b>				
1	Management of enterprise potential	3	120	4
2	Management of enterprise activity on the market of goods and services	3	120	4
<b>Total part of master's program</b>			<b>240</b>	<b>8</b>
<b>2.2.2.2. Master's program "Quality Management"</b>				
1	Complex system of quality management of products and services	3	120	4
2	Information management of labour and product quality	3	120	4
<b>Total part of master's program</b>			<b>240</b>	<b>8</b>
<b>2.2.2.3. Master's program "Management of enterprise strategic development"</b>				
1	Management of enterprise organizational development	3	120	4
2	Diagnostics in management system	3	120	4
<b>Total part chosen of master's program</b>			<b>240</b>	<b>8</b>
<b>2.2.2.5. Master's program "Management of cooperative groups"</b>				
1	Management of cooperative activity	3	120	4
2	Environment for cooperative business development	3	120	4
<b>Total part of master's program</b>			<b>240</b>	<b>8</b>
<b>Total part chosen by a student</b>			<b>360</b>	<b>12</b>
<b>Total elective part</b>			<b>600</b>	<b>20</b>
<b>3. OTHER FORMS OF TRAINING</b>				
1	Production and pre-diploma practice	2,3	450	15
2	Writing and defense of master thesis		450	15
<b>Total</b>			<b>900</b>	<b>30</b>
<b>Total in educational program</b>			<b>2700</b>	<b>90</b>

**Curriculum of Master training  
in educational program "Management of organizations and administration"  
(educational and research program of master's training)**

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Business Management	1	150	5
2	Psychology of management and conflict management	1	120	4
3	Contract law	1	120	4
4	Management of enterprise competitiveness	1	150	5
5	Corporate management	2	150	5
6	Project management in organization	2	180	5
7	Quality management	2	120	4
8	Change management	2	120	4
9	Business ethics and corporate social responsibility	2	150	5
10	Management of financial reorganization and bankruptcy	4	120	4
11	International standardization and certification of technologies, raw materials and finished products	4	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
<b>Total standard part</b>			<b>1470</b>	<b>49</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by the university</b>				
1	Agricultural policy	1	120	4
2	Methodology and organization of scientific research with the principles of intellectual property	1	180	6
3	Business foreign language	4	90	3
<b>Total part offered by the university</b>			<b>210</b>	<b>13</b>
<b>2.2. Disciplines chosen by a student</b>				
<b>2.2.1 Free chose disciplines</b>				
1	Management of enterprise strategic development	2	120	4
2	Investment management	2	120	4
3	Risk and economic security management	2	120	4
4	Marketing management	2	120	4
5	Information systems and technologies in organization management	2	120	4
<b>Total part free chose</b>			<b>120</b>	<b>4</b>
<b>2.2.2.1. Master's program "Management on the market of goods and services"</b>				
1	Management of enterprise potential	2	120	4
2	Management of enterprise activity on the market of goods and services	2	120	4
3	Mathematical models in management and marketing	4	120	4
4	Business planning of innovative projects	4	120	4
<b>Total part of master's program</b>			<b>480</b>	<b>16</b>
<b>2.2.2.2. Master's program "Quality Management"</b>				
1	Complex system of quality management of products and services	2	120	4
2	Information management of labour and product quality	2	120	4
3	Mathematical models in management and marketing	4	120	4
4	Business planning of innovative projects	4	120	4
<b>Total part of master's program</b>			<b>480</b>	<b>16</b>
<b>2.2.2.3. Master's program "Management of enterprise strategic development"</b>				
1	Management of enterprise organizational development	2	120	4
2	Diagnostics in management system	2	120	4
3	Mathematical models in management and marketing	4	120	4
4	Business planning of innovative projects	4	120	4
<b>Total part chosen of master's program</b>			<b>480</b>	<b>16</b>
<b>2.2.2.5. Master's program "Management of cooperative groups"</b>				
1	Management of cooperative activity	2	120	4
2	Environment for cooperative business development	2	120	4
3	Mathematical models in management and marketing	4	120	4
4	Business planning of innovative projects	4	120	4
<b>Total part of master's program</b>			<b>480</b>	<b>16</b>
<b>Total part chosen by a student</b>			<b>600</b>	<b>20</b>
<b>Total elective part</b>			<b>990</b>	<b>33</b>
<b>3. OTHER FORMS OF TRAINING</b>				
1	Production and pre-diploma practice	2,3	450	15
2	Pedagogical practice	3	150	5
3	Writing and defense of master thesis		540	18
<b>Total</b>			<b>1140</b>	<b>38</b>
<b>Total in educational program</b>			<b>3600</b>	<b>120</b>

## Annotation of disciplines in the curriculum of educational and professional program of master's training

### 1. STANDARD ACADEMIC DISCIPLINES

**Business Management.** The essence of business. Business and entrepreneurship. Signs and principles of entrepreneurial activity. Legal basis of entrepreneurship. The concept of an entity. Subjects of microenterprise, small, medium and large enterprises. Types and organizational - legal forms of entrepreneurship, management of them. Enterprise and individual entrepreneurship. Features of management of enterprises of certain types (organizational forms of enterprises). Organizational-legal forms of business associations. Citizen as a business entity. The process of creating your own business.

**Psychology of management and conflict management.** The aim of the discipline is to study the general laws, mechanisms of formation and development of cognitive mental processes, properties, states and formations in the process of management, under stress and conflict. The objective of the course is to form the system of theoretical and methodological knowledge on the problems of psychological science and practice, knowledge of the structural elements of the psyche - mental cognitive processes, properties, states and formations at the level of representation and interpretation for practical application and implementation in the professional activity of future managers.

**Contract law.** The aim of the discipline is to give students a system of legal knowledge on drafting, execution and termination of various kinds of commercial contracts. The discipline studies: the main categories of contract law; order of drafting contracts, including commercial contracts; peculiarities of certain types of agreements in the sphere of economic activity; procedure of bringing contractual entities to responsibility for breach of contract.

**Management of enterprise competitiveness.** The discipline aims to teach students to assess the competitiveness of enterprises, to identify factors of its formation. Future specialists will be able to determine the competitiveness of any company, as well as obtain the knowledge to develop a system of improvement measures.

**Corporate management.** The aim of the discipline is to introduce students to the theoretical basics of corporate management, institutional and information instruments to ensure functioning of the system of corporate management at enterprises.

**Project management in organization.** The main aim of the discipline is to form appropriate practical skills in application of universal instruments of project design and implementation in order to achieve effective functioning and development of an organization. The objective of the discipline is to provide students with scientific and methodological basis to master the main tools of project management in an organization.

**Quality management.** The aim of the discipline is to develop the system of knowledge on the theory and methodology of quality management, principles of formation and operation of quality management systems, to master the legal, institutional and economic issues of quality management. The main objective of the course is theoretical and practical training of students in quality management organization and functioning.

**Change management.** The aim of the discipline is to give practical knowledge and obtain practical skills in management process organization. The objectives of the discipline: understanding the essence of changes and the nature of their origin; formation of scientific outlook and knowledge of technologies and methods of managing change in organizations; study of the peculiarities of organization functioning under continuous change.

**Business ethics and corporate social responsibility.** The object of the disciplines is business communication, the subject is its moral and psychological aspects, ethical and psychological mechanisms. This new discipline includes various branches of

sciences (ethics, psychology, philosophy, sociology) and practices (administration, management, etc.). The most significant components are ethics, psychology and management of science which deal with human nature and human behavior (from different viewpoints) and factors affecting the vital activities of people and their interaction.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by university

**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.

### 2.2. Disciplines chosen by a student

#### 2.2.1. Free chose disciplines

**Management of enterprise strategic development.** Ensuring an adequate balance between the main strategy of the organization's development as a goal and functionally-providing strategies. Provide a balanced approach to strategic and system changes in all functional subsystems in the context of the chosen main strategic goal of the organization's development. Ensuring sustainability in the strategic development of all components at the stages of the fluctuation and bifurcation period. Providing competitive innovations in the pace of development of strategic orientation enterprises.

**Investment management.** The aim of the discipline is to develop students' modern economic thinking and the system of expertise in the field of investment activity of enterprises, competences based on mastering the basic theoretical principles and practical skills to effectively manage an enterprise.

**Risk and economic security management.** The discipline studies theory, ontology and epistemology of risk and economic security; the essence, perception and systemic risk analysis in the economy and business; a system of objective and subjective quantitative estimates of risk and economic security, methods of risk management and modeling of economic risk and economic security; the concept of game theory; multi-game and multi-criteria game models of economic problems, game hierarchical models of justification of making multi-purpose and multi-criteria decisions.

**Marketing Management.** The discipline studies the system of administrative relations in marketing departments and their relationship with other business units. The

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aim of the discipline is to form modern understanding of marketing management opportunities to achieve transition to a new level and forms of consumption by means of situational market analysis, forecasting consumer needs evolution, strategic planning of goods and services movement stimulation, organization of sales, providing increased entrepreneurial resistance on domestic market. The main objectives of the discipline is to provide fundamental knowledge in marketing management to ensure and expand of entrepreneurial activity in specific organizations and environments.

**Information systems and technologies in organization management.** The aim of the discipline is to develop in future managers the knowledge and skills in modern information systems and technologies, and practical skills of effective use of modern information technologies in the process of organization management.

### ***2.2.1. Master's program "Management on the market of goods and services"***

**Management of enterprise potential.** The aim of the discipline is to increase the efficiency of organizational structures through the proper use of different levels of management principles and tools by managers, creation of an integrated system of administrative management of an organization.

**Management of enterprise activity on the market of goods and services:** The main aim of the discipline is to develop modern management thinking and the system of expertise in management, to form a conceptual understanding of the principles of the organization systemic management; to acquire skills of analyzing internal and external environment, make appropriate management decisions.

### ***2.2.2. Master's program "Quality Management"***

**Complex system of quality management of products and services.** The aim of the discipline is to form students' system of knowledge about theory and methodology of quality management, principles of formation and operation of quality management systems for different types of goods (products and services), study of legislative and regulatory, organizational and economic issues on quality management of goods (services). The main objectives of the course are to learn quality management terminology; to study the problem of quality at present and its impact on the national economy; to study the domestic and international experience in product quality management for its further development; to create and implement product quality systems; to use methodological principles of management: general approaches to product quality, principles and techniques.

**Information management of labour and product quality.** The aim of the discipline is to develop basic knowledge and skills to manage information resources in the field of quality. The objective of the discipline is to provide knowledge on theoretical and methodological principles of information quality management; the main provisions of information quality management; information as a resource of quality development; essence and basic principles of a systematic approach to information processing and use in quality management.

### ***2.2.3. Master's program "Management of enterprise strategic development"***

**Management of enterprise organizational development.** The course aims to help students master a wide range of issues related to organizational peculiarities of functioning and development of modern enterprises (restructuring, business process reengineering, virtual business and other new organizational types) and their specific integration activities.

**Diagnostics in management system.** The course aims to provide knowledge

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about the use of methods and tools of economic diagnostics in enterprise management. The main objectives of the course are: to study the peculiarities of industrial and economic activity of domestic enterprises and justification of preconditions and factors that significantly impact the internal economic mechanism of every enterprise; generalization and systematization of knowledge in mastering the skills of economic diagnostics in different directions to ensure effective management.

#### **2.2.4. Master's program "Management of cooperative groups"**

**Management of cooperative activity.** The course aims to help students master a wide range of issues related to the peculiarities of management of cooperative enterprises: to perform basic and special functions of management, adherence to the principles and the use of management methods, formation of communication systems, establishing leadership relations, decision-making, formation of favorable conditions for cooperative development.

**Environment for cooperative business development.** The aim of the discipline is to provide knowledge to identify, analyze and regulate environmental factors that affect the development of cooperatives. The discipline studies the issues of legal, social and economic support of coordinated teamwork in the units of cooperative type at international, national, regional and local levels.

### **Annotation of disciplines in the curriculum of educational and research program of master's training**

#### **1. STANDARD ACADEMIC DISCIPLINES**

**Business Management.** The essence of business. Business and entrepreneurship. Signs and principles of entrepreneurial activity. Legal basis of entrepreneurship. The concept of an entity. Subjects of microenterprise, small, medium and large enterprises. Types and organizational - legal forms of entrepreneurship, management of them. Enterprise and individual entrepreneurship. Features of management of enterprises of certain types (organizational forms of enterprises). Organizational-legal forms of business associations. Citizen as a business entity. The process of creating your own business.

**Psychology of management and conflict management.** The aim of the discipline is to study the general laws, mechanisms of formation and development of cognitive mental processes, properties, states and formations in the process of management, under stress and conflict. The objective of the course is to form the system of theoretical and methodological knowledge on the problems of psychological science and practice, knowledge of the structural elements of the psyche - mental cognitive processes, properties, states and formations at the level of representation and interpretation for practical application and implementation in the professional activity of future managers.

**Contract law.** The aim of the discipline is to give students a system of legal knowledge on drafting, execution and termination of various kinds of commercial contracts. The discipline studies: the main categories of contract law; order of drafting contracts, including commercial contracts; peculiarities of certain types of agreements in the sphere of economic activity; procedure of bringing contractual entities to responsibility for breach of contract.

**Management of enterprise competitiveness.** The discipline aims to teach students to assess the competitiveness of enterprises, to identify factors of its formation. Future specialists will be able to determine the competitiveness of any company, as well as obtain the knowledge to develop a system of improvement measures.

**Corporate management.** The aim of the discipline is to introduce students to the theoretical basics of corporate management, institutional and information instruments to ensure functioning of the system of corporate management at enterprises.

**Project management in organization.** The main aim of the discipline is to form appropriate practical skills in application of universal instruments of project design and implementation in order to achieve effective functioning and development of an organization. The objective of the discipline is to provide students with scientific and methodological basis to master the main tools of project management in an organization.

**Quality management.** The aim of the discipline is to develop the system of knowledge on the theory and methodology of quality management, principles of formation and operation of quality management systems, to master the legal, institutional and economic issues of quality management. The main objective of the course is theoretical and practical training of students in quality management organization and functioning.

**Change management.** The aim of the discipline is to give practical knowledge and obtain practical skills in management process organization. The objectives of the discipline: understanding the essence of changes and the nature of their origin; formation of scientific outlook and knowledge of technologies and methods of managing change in organizations; study of the peculiarities of organization functioning under continuous change.

**Business ethics and corporate social responsibility.** The object of the disciplines is business communication, the subject is its moral and psychological aspects, ethical and psychological mechanisms. This new discipline includes various branches of sciences (ethics, psychology, philosophy, sociology) and practices (administration, management, etc.). The most significant components are ethics, psychology and management of science which deal with human nature and human behavior (from different viewpoints) and factors affecting the vital activities of people and their interaction.

**Management of financial reorganization and bankruptcy.** The aim of the discipline is to teach students to determine the nature of the financial reorganization and bankruptcy, prepare and implement the mechanism of reorganization plan of the debtor, to operate such categories as pre-trial reorganization, in-court reorganization, bankruptcy; formation of students' theoretical and methodological principles to apply the knowledge and skills of reorganization and bankruptcy, determination of the curative ability of an enterprise and evaluation of procedures of reorganization and liquidation of the debtor.

**International standardization and certification of technologies, raw materials and finished products.** The aim of the discipline is to provide students with the scientific and theoretical principles, methodological and organizational issues of standardization and certification of technologies, raw materials and finished products. The objectives of the discipline: to learn the basics of standardization and certification of product quality indexes, evaluation methods and prospects of international standardization and certification, to develop abilities to use normative and technical documents to solve practical problems of certification of technologies, raw materials and finished products.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by university

**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

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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.

**Business foreign language.** The overall objective of the program of foreign language teaching for specific purposes is to develop students' professional language competences that will contribute to their effective functioning in diverse cultural, educational and professional environment.

## 2.2. Disciplines chosen by a student

### 2.2.1. Free chose disciplines

**Management of enterprise strategic development.** Ensuring an adequate balance between the main strategy of the organization's development as a goal and functionally-providing strategies. Provide a balanced approach to strategic and system changes in all functional subsystems in the context of the chosen main strategic goal of the organization's development. Ensuring sustainability in the strategic development of all components at the stages of the fluctuation and bifurcation period. Providing competitive innovations in the pace of development of strategic orientation enterprises.

**Investment management.** The aim of the discipline is to develop students' modern economic thinking and the system of expertise in the field of investment activity of enterprises, competences based on mastering the basic theoretical principles and practical skills to effectively manage an enterprise.

**Risk and economic security management.** The discipline studies theory, ontology and epistemology of risk and economic security; the essence, perception and systemic risk analysis in the economy and business; a system of objective and subjective quantitative estimates of risk and economic security, methods of risk management and modeling of economic risk and economic security; the concept of game theory; multi-game and multi-criteria game models of economic problems, game hierarchical models of justification of making multi-purpose and multi-criteria decisions.

**Marketing Management.** The discipline studies the system of administrative relations in marketing departments and their relationship with other business units. The aim of the discipline is to form modern understanding of marketing management opportunities to achieve transition to a new level and forms of consumption by means of situational market analysis, forecasting consumer needs evolution, strategic planning of goods and services movement stimulation, organization of sales, providing increased entrepreneurial resistance on domestic market. The main objectives of the discipline is to provide fundamental knowledge in marketing management to ensure and expand of entrepreneurial activity in specific organizations and environments.

**Information systems and technologies in organization management.** The aim of the discipline is to develop in future managers the knowledge and skills in modern

information systems and technologies, and practical skills of effective use of modern information technologies in the process of organization management.

### **2.2.1. Master's program "Management on the market of goods and services"**

**Management of enterprise potential.** The aim of the discipline is to increase the efficiency of organizational structures through the proper use of different levels of management principles and tools by managers, creation of an integrated system of administrative management of an organization.

**Management of enterprise activity on the market of goods and services:** The main aim of the discipline is to develop modern management thinking and the system of expertise in management, to form a conceptual understanding of the principles of the organization systemic management; to acquire skills of analyzing internal and external environment, make appropriate management decisions.

**Mathematical models in management and marketing.** The aim of the discipline is to provide students with mathematical knowledge to solve problems in professional activity, analytical thinking skills and mathematical formulation of the economic problems arising in the process of management.

**Business planning of innovative projects.** The main aim of the discipline is to provide students with modern theoretical principles and practical skills of innovation management of an organization. The main tasks are theoretical training of students and formation of skills in innovation management of an organization.

### **2.2.2. Master's program "Quality Management"**

**Complex system of quality management of products and services.** The aim of the discipline is to form students' system of knowledge about theory and methodology of quality management, principles of formation and operation of quality management systems for different types of goods (products and services), study of legislative and regulatory, organizational and economic issues on quality management of goods (services). The main objectives of the course are to learn quality management terminology; to study the problem of quality at present and its impact on the national economy; to study the domestic and international experience in product quality management for its further development; to create and implement product quality systems; to use methodological principles of management: general approaches to product quality, principles and techniques.

**Information management of labour and product quality.** The aim of the discipline is to develop basic knowledge and skills to manage information resources in the field of quality. The objective of the discipline is to provide knowledge on theoretical and methodological principles of information quality management; the main provisions of information quality management; information as a resource of quality development; essence and basic principles of a systematic approach to information processing and use in quality management.

**Mathematical models in management and marketing.** The aim of the discipline is to provide students with mathematical knowledge to solve problems in professional activity, analytical thinking skills and mathematical formulation of the economic problems arising in the process of management.

**Business planning of innovative projects.** The main aim of the discipline is to provide students with modern theoretical principles and practical skills of innovation management of an organization. The main tasks are theoretical training of students and formation of skills in innovation management of an organization.

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### ***2.2.3. Master's program "Management of enterprise strategic development"***

**Management of enterprise organizational development.** The course aims to help students master a wide range of issues related to organizational peculiarities of functioning and development of modern enterprises (restructuring, business process reengineering, virtual business and other new organizational types) and their specific integration activities.

**Diagnostics in management system.** The course aims to provide knowledge about the use of methods and tools of economic diagnostics in enterprise management. The main objectives of the course are: to study the peculiarities of industrial and economic activity of domestic enterprises and justification of preconditions and factors that significantly impact the internal economic mechanism of every enterprise; generalization and systematization of knowledge in mastering the skills of economic diagnostics in different directions to ensure effective management.

**Mathematical models in management and marketing.** The aim of the discipline is to provide students with mathematical knowledge to solve problems in professional activity, analytical thinking skills and mathematical formulation of the economic problems arising in the process of management.

**Business planning of innovative projects.** The main aim of the discipline is to provide students with modern theoretical principles and practical skills of innovation management of an organization. The main tasks are theoretical training of students and formation of skills in innovation management of an organization.

### ***2.2.4. Master's program "Management of cooperative groups"***

**Management of cooperative activity.** The course aims to help students master a wide range of issues related to the peculiarities of management of cooperative enterprises: to perform basic and special functions of management, adherence to the principles and the use of management methods, formation of communication systems, establishing leadership relations, decision-making, formation of favorable conditions for cooperative development.

**Environment for cooperative business development.** The aim of the discipline is to provide knowledge to identify, analyze and regulate environmental factors that affect the development of cooperatives. The discipline studies the issues of legal, social and economic support of coordinated teamwork in the units of cooperative type at international, national, regional and local levels.

**Mathematical models in management and marketing.** The aim of the discipline is to provide students with mathematical knowledge to solve problems in professional activity, analytical thinking skills and mathematical formulation of the economic problems arising in the process of management.

**Business planning of innovative projects.** The main aim of the discipline is to provide students with modern theoretical principles and practical skills of innovation management of an organization. The main tasks are theoretical training of students and formation of skills in innovation management of an organization.

**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	125
– 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
Qualification of graduates	master degree in management of foreign economic activity, manager (administrator) of foreign economic activity

**The concept of training**

The main task of training masters in foreign economic activity is to provide international and joint enterprises and organizations in the field of agribusiness with specialists able to perform the planning and forecasting the activity of foreign economic entities (subdivision); forecasting the dynamics of demand for export and import products; development and justification of the areas and means of expanding markets economic entities; make effective management decisions in the process of foreign economic activity; organize foreign economic activity of the entity to achieve its mission; manage the quality and competitiveness of domestic products on the world market; organize business on international markets; monetary and financial management of foreign economic activity; organization of promotional activities of foreign economic activity; form the company image on the international market; monitor implementation of foreign operations; report on foreign economic activity.

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

***Master's program "International business management"***

Combines the study of business disciplines in the global context with understanding of cultural and social processes in different countries. Graduates will be able to perform managerial work, considering the economic and cultural diversity of the real market entities. In addition to basic knowledge in the field of foreign economic activity graduates will obtain skills in market analysis, decision making, project management; understand the specific features and other cultures, which will enable them to work in different countries in a multinational, multicultural environment.

**Areas of employment for graduates**

Managers of structural units at the international enterprises and departments of foreign economic activity of domestic enterprises of agrarian sector.

***Master's program "International commercial activity"***

Provides training of specialists, able to understand the constantly changing situation on the international market and skillfully apply the benefits of the world market; organize and carry out international transactions; assess the economic efficiency of foreign economic operations; independently develop foreign trade contracts and conduct negotiations with foreign companies; carry out foreign economic activities using the basic forms and methods of foreign economic activity.

**Areas of employment for graduates**

Managers of structural units at the international enterprises and departments of foreign economic activity of domestic enterprises of agrarian sector.

***Master's program "International agrarian diplomacy"***

The training program for for specialists who would be able to work at embassies and consulates in order to create a favorable foreign business environment for the promotion of domestic agricultural products to foreign markets. Graduates gain knowledge of the foundations of diplomacy, international politics and international relations, European integration and agriculture. In addition, they will be able to use modern information resources, apply methods of econometric modeling for analyzing and forecasting the state of the world agrarian markets; negotiate with representatives of international business and state authorities of foreign countries.

**Areas of employment for graduates**

Management of structural subdivisions at embassies and consulates specializing in the development of international relations in the agro-food sector.

**Practical training**

Master students get skills in modern management methods applied in international trade, primarily, by joint ventures and international corporations. Much attention is paid to the activity of domestic enterprises and organizations operating on the world market. Considering the peculiarities of commercial operations in the partner countries, students learn to apply the knowledge obtained during the course in various situations that may arise when concluding international agreements.

**Proposed theme for master thesis**

1. Trade and economic cooperation between Ukraine and the countries - EU members.
2. Foreign economic security of the state in conditions of European integration of Ukraine.
3. Organizational and economic mechanism of creation and operation of joint ventures in Ukraine.
4. International leasing in the conditions of market transformation of Ukraine.
5. Marketing strategies of European companies and the experience of their implementation in Ukraine.
6. Risk Management in the process of an enterprise entering foreign markets.
7. World trade of agricultural products and prospects of Ukrainian export development.
8. The export potential of grain sector of Ukraine.
9. Ukrainian Foreign Trade of agro-food production in globalizing world economy.
10. Competition on agricultural global markets.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2017;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational program "Management of foreign economic activity"  
(educational and professional program of master's training)**

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	International private law	1	120	4
2	Management of FEA	1, 2	210	7
3	Business protocol and negotiation	1	120	4
4	World agriculture and food resources	1	120	4
5	State regulation of FEA	2	120	4
6	International credit-settlement and currency transactions	1	120	4
7	Organization and techniques of FEO	1	120	4
8	International economic activity	1	120	4
<b>Total standard part</b>			<b>1050</b>	<b>35</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by the university</b>				
1	Agricultural policy	2	120	4
2	Methodology and organization of scientific research with the principles of intellectual property	2	120	4
3	Management of international projects	2	150	5
<b>Total part offered by the university</b>			<b>390</b>	<b>13</b>
<b>2.2. Disciplines chosen by a student</b>				
<b>2.2.1 Free chose disciplines</b>				
1	Business game (Business Management)	1	120	4
2	International customs regulations	1	120	4
<b>Total part free chose</b>			<b>240</b>	<b>8</b>
<b>2.2.1. Master's program "International business management"</b>				
1	International business	2	120	4
2	Strategies in international business	2	120	4
3	Cross-culturing management	2	120	4
<b>Total part of master's program</b>			<b>360</b>	<b>12</b>
<b>2.2.2. Master's program "International commercial activity"</b>				
1	Risk management in international commercial activity	2	120	4
2	International commercial activity	2	120	4
3	Logistics in FEA	2	120	4
<b>Total part of master's program</b>			<b>360</b>	<b>12</b>
<b>2.2.3. Master's program "International agrarian diplomacy"</b>				
1	Communication and information resources	2	120	4
2	International politics and international relations	2	120	4
3	Business Management	2	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
4	The basics of diplomacy	2	150	5
5	Econometric modeling	2	180	6
6	French language	2	180	6
7	International organisations	2	120	4
8	Production economics	2	150	5
9	Marketing management	3	150	5
10	European integration and agriculture	3	150	5
11	Strategic management	3	120	4
12	Forecasting and planning	3	120	4
13	Regional development	3	120	4
14	World food markets	3	120	4
<b>Total part of master's program</b>			<b>360</b>	<b>12</b>
<b>Total part chosen by a student</b>			<b>1260</b>	<b>42</b>
<b>Total elective part</b>			<b>1650</b>	<b>55</b>
<b>3. OTHER FORMS OF TRAINING</b>				
1	Production and pre-diploma practice	2,3	300	10
2	Writing and defense of master thesis		360	12
<b>Total</b>			<b>660</b>	<b>22</b>
<b>Total in educational program</b>			<b>2700</b>	<b>90</b>

### 1. STANDARD ACADEMIC DISCIPLINES

**International private law.** The aim of the discipline is to provide students with the system of legal knowledge on drafting, execution and termination of various kinds international. The discipline studies: basic categories of international private law; order contract drafting, in particular international contracts; peculiarities of certain types of agreements in international activities; procedure of bringing contractual entities to responsibility for breach of contract.

**Management of foreign economic activity.** The aim of the discipline is to develop students' managerial thinking, system of knowledge and practical skills to manage foreign economic activity (FEA). The student will master practical skills of international management process, application of various tools and technology of management when considering specific situations in foreign economic activity.

**Business protocol and negotiating.** The discipline studies modern management requirements, in particular, business protocol and ethics as its important component, enterprise responsibility as the first step towards ethical conduct, preparation for negotiations, negotiating (the main stages and their characteristics), methods of negotiating, negotiation styles, analysis of the results of negotiations and implementation of the agreements, rules and regulations of business meetings, highlights of meeting arrangements, preparation of venues and meeting of delegations.

**World agriculture and food resources.** The main aim of the course is to provide the deep study of laws of development of world agriculture, systematized and generalized knowledge of agricultural economy of individual countries and regions in the context of global trends of development of agricultural production and international relations.

**State regulation of FEA.** The main purpose of the discipline "State regulation of foreign economic activity" is the study of modern methods and tools for regulation of foreign economic activity, factors influencing the choice of regulatory policy in foreign trade, foreign investment and monetary and financial spheres of the country's economy, and directions of formation of an effective system of state regulation of foreign economic activity. The main tasks of the discipline are: familiarization of students with the corresponding concepts, categories, methods and instruments of regulation of foreign

economic activity; acquiring practical skills in the choice of regulatory policy in foreign trade, foreign investment and monetary and financial spheres of the country's economy; education of ability to creative search of directions and reserves of improvement of foreign economic activity.

**International credit-settlement and currency transactions.** The aim of the discipline is to form students' ability to carry out credit-settlement and currency transactions. The task of the course is to master theoretical knowledge and practical skills of carrying out credit - settlement and currency transactions when dealing with foreign economic activities of exporters and importers.

**Organization and techniques of FEO.** The aim of the discipline is to provide students with a system of knowledge of objective laws, conditions, processes and specific peculiarities of foreign economic activities, and practical skills of their application. The course focuses on development of students' holistic understanding of processes in foreign economic activity and formation of students' practical skills to apply data base to analyze the global economic environment in order to choose the strategy of entering foreign markets.

**International economic activity.** The aim of the discipline is to provide future managers with basic and special knowledge of the problems and prospects of international economic relations for professional use. The course focuses on development of students' holistic understanding of processes that characterize international level of interaction of national economies and formation of students practical skills to carry out independent analysis of global economic processes.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by university

**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, psychology, methodological support of research activities at the stages of writing graduate and postgraduate thesis. The discipline also involves formation of culture and skills of doing research, practical implementation of the results. The discipline is important in conditions of intensive market development of objects of intellectual property, making them an essential factor of enterprise competitiveness and the economy on the whole. The objective of the discipline is to form a complex of theoretical knowledge on intellectual property as a significant economic-legal category of information society.

**Management of international projects.** The course "Management of International Projects" examines the modern methodology of project management, the main stages, approaches and basic tools of the project management methodology. The most up-to-date algorithm of the logical-structural approach used by international organizations in the development of development and restructuring projects is presented. The main purpose of the course is to provide students with an idea of the methodology of preparation and implementation, ways and means of attracting resources for the implementation of projects and mechanisms for managing them.

## 2.2. Disciplines chosen by a student

### 2.2.1. Free chose disciplines

**Business game (Business Management).** The main aim of the discipline is to develop students' knowledge of the basic principles, the main categories, modern concepts, theoretical principles and practical methods of managing the main enterprise activities and skills of developing operational strategy, creating and applying branch operational subsystems as a basis for achieving an organization's mission.

**International customs regulations.** The aim of the course is to make students aware of the place of the law regulating international customs relations in the system of international law, norms and values of their relationship with their practical application by the relevant authorities. The objective of the course are: to introduce students to the major sources of international customs regulation; to master the most important regulations, ability to apply them; knowledge of the principles of regulation and the ability to use the content when solving specific problems and issues.

#### 2.2.2.1. Master's program "International business management"

**International business.** Objective: to provide students with knowledge about the specifics of functioning of modern international business and peculiarities of analytical approaches to studying foreign economic environment and formation of strategies of enterprise behavior on foreign markets. The students learn the theoretical categories and principles of international business as well as drafting and conclusion of international agreements (contracts).

**Strategies in international business.** The main aim of the discipline is to provide students with the theoretical basis of modern strategic management and practical skills for making strategic decisions in management and development activities of an enterprise on the international market. The main tasks are: theoretical training of students and formation of skills in strategic management of an enterprise.

**Cross-culturing management.** The course "Cross-cultural management" deals with the management of relations arising on the border of national and organizational cultures, exploring the causes of intercultural conflicts and their neutralization, clarification and use in the management of the organization of the patterns of behavior inherent in the national business culture. The aim of the discipline is to form a cross-cultural approach to doing business in today's globalization in order to increase the effectiveness of management activities and apply the knowledge gained in practice.

#### 2.2.2. Master's program "International commercial activity"

**Risk management in international commercial activity.** The aim of the discipline is to provide students with knowledge of terminology of risk theory in international business, means of risk assessment, methods of risk measuring under uncertainty and protection against them. Objective: to extend and deepen the knowledge of qualitative and quantitative characteristics of economic processes taking risk into account; to master methods and techniques of construction, analysis and application of mathematical economic models that take risk into account; to study the basic methods and ways for assessing and optimizing risk; to learn the strategies of international risk management.

**International commercial activity.** The aim of the course is to provide the formation of the system of knowledge and skills of prospective traders in establishing effective business in the international market of goods and services. The objective of the course is to teach future professionals to form optimal proportions between production and related business areas, to ensure effective circulation of goods and services, establish a dynamic balance of the market. The challenge of course is to study scientific and

theoretical principles of international commercial activity in the global market of goods and services in the field of commercial services, management of commercial activities.

**Logistics in FEA.** The aim of the discipline is to form systemic knowledge of the conceptual bases of logistics in FEA, theory and practice of this direction and skills of independent work regarding up-to-date methods of managing material and other flows in modern conditions.

### ***2.2.3. Master's program "International agrarian diplomacy"***

**Communication and information resources.** Theoretical foundations and hardware of modern information systems. Data management. Software for the processing of economic information. Organize effective web search. Applied economic data processing software.

**International politics and international relations.** The essence and structure of international politics. Definition and main directions of international relations. Political idealism, political realism, modernism, trans nationalism, neo-Marxism and neo-realism. Basic types of international systems. Geo-economic and geopolitical paradigm of development of international relations. World political process.

**Business Management.** Fundamental economic concepts. Expenses on the exploitation of fixed assets. Classification of costs and output at agricultural enterprises. Fundamentals of Production Theory. Multiperiodic calculations of investment efficiency. Agrarian management. Planning of enterprise economic activity with the help of program planning II. Active teaching methods and their role in the preparation of future masters. Human and social capital. Types of investment in human capital and their efficiency. Leadership and Leadership in Organization: Theory and Practice. Time management. Modern experience of preparing managers for business.

**The basics of diplomacy.** Diplomacy and international law. Historical Types of Diplomacy. Development of the theory and practice of diplomacy. Diplomatic and consular services. Diplomatic representation and its international legal status. Foreign diplomatic services. International Organizations and their Importance in Diplomatic Relations. Ukraine's place in modern international relations.

**Econometric modeling.** Formation of the knowledge system on the methodology and tools for constructing and using various types of economic and mathematical models, studying the basic principles and tools for setting tasks, constructing economic and mathematical models, methods for their solution and analysis for use in economics, acquiring theoretical foundations and practical skills on questions of setting up, solving optimization and management problems of the economy by the tools of mathematical methods.

**French language.** Comprehensive training of language professional activities. Types of linguistic activity: reading, listening, speaking. Formation of dialogue and monologue speech skills and preparation of students for professional communication in oral and written forms in a foreign language. Mastering the skills of the translation of special texts as a means of adequately explaining the content of scientific information. Formation of knowledge, skills and abilities that will provide the masters with the necessary communication skills in the field of professional communication.

**International organisations.** The purpose of studying the discipline is to provide students with comprehensive and systematic knowledge about the activities and influence of international organizations on the practice of doing business in a globalized world. The key tasks of the course include: to familiarize students with the preconditions for the emergence of international organizations in the world; to find out the essence, functions and types of international organizations; to substantiate the influence of international

organizations on the results of the work of business entities at micro, meso- and macro levels; consider the current trends in the development of international organizations in the face of new challenges and threats to the global economy.

**Production economics.** Methodology for assessing the economic efficiency of production. Production of marketable crop production. Processes of production of fodder crops. Dairy cattle breeding. Keeping and fattening cattle. Breeding pig breeding. Feeding pigs. Determination of the need for working capital. Simplified the planning of the enterprise's business with the help of program planning I and II.

**Marketing Management.** The discipline studies the system of administrative relations in marketing departments and their relationship with other business units. The aim of the discipline is to form modern understanding of marketing management opportunities to achieve transition to a new level and forms of consumption by means of situational market analysis, forecasting consumer needs evolution, strategic planning of goods and services movement stimulation, organization of sales, providing increased entrepreneurial resistance on domestic market. The main objectives of the discipline is to provide fundamental knowledge in marketing management to ensure and expand of entrepreneurial activity in specific organizations and environments.

**European integration and agriculture.** The aim of the discipline is to provide students with modern knowledge of European integration, which will enable managers to create a new model that will be able to make the right decisions in the context of Ukraine's European integration into the European Union. The tasks of the discipline are: to teach students to determine the economic effects of international economic integration, to familiarize them with the stages of formation and development of the European Union, to provide in-depth knowledge on the peculiarities of the implementation of the Common Agricultural Policy of the EU and to teach students to identify the threats and opportunities from the process of integration of the Ukrainian economy into the EU.

**Strategic management.** Essence and development of the theory of strategic management. The process of strategic management: the essence and components. The environment of the organization and its strategic analysis. Formation of strategic goals of the enterprise. System of enterprise strategies. Portfolio Analysis Methods and Tools. The theory of decision making. Models of solving problems of disruptive activity. Transport tasks and logistics. Model of optimal investment portfolio formation. Quantitative methods for project management.

**Forecasting and planning.** The essence and principle difference of the concepts of "forecasting" and "planning". Classification of species and methods of forecasting. Classification of the system of planning on the micro, meso and macronutrients. Principles of forecasting. Algorithm of planning of economic activity of the enterprise.

**Regional development.** Determination and assessment of the level of economic development of the region. Forecasting and planning of regional development. Organization of regional management. Development and improvement of organizational structures of management, definition of their main properties and types. Control and regulation of regional development.

**World food markets.** The objectives of the discipline are to: teach students the laws of the development of world agrarian markets, to provide future specialists with systematization and harmonization of knowledge about the peculiarities of the formation and functioning of food markets in some countries and regions in the context of deepening the process of globalization. The tasks of the discipline are: to develop knowledge of students about the main laws of the functioning of world agricultural markets; to teach students to analyze the current state and evaluate future trends in the industry on a global scale, to use methods and foreign experience to improve the domestic agro-food market.

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**Training of masters of sciences  
in branch of knowledge "Management and Administration"  
in specialty "MANAGEMENT"  
educational program "ADMINISTRATIVE MANAGEMENT"**

Form of training	Licensed number of students:
– full-time	50
– part-time	50
Duration of training	
– full-time educational and professional program	1,5 year
– part-time	2 year
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian, English, German
Qualification of graduates	manager (administrator) in administrative management

**The concept of training**

The specialization focuses on training highly qualified managers able to manage agricultural business applying deep professional knowledge and skills, modern computer technologies, innovation methods and foreign languages. Experts may occupy executive positions in companies and organizations of agro-industrial production as well as in central and local government bodies.

Educational program "Administrative Management" is the highest level of business qualification of a manager and most prestigious education program in the world of business. The specialization provides training of senior managers of new generation, competitive in the labor market and capable of creative professional and innovative management in global competitive environment. The specialization provides students with integrated knowledge system, combining fundamental economic education with practical skills of management decision-making, teamwork, conducting negotiations and presentations in professional activity in the field of business management.

**Educational and professional training program**

Training of specialists for management of the effective production process in agricultural business entities by implementing intensive production technologies, cost reduction, increase of economic efficiency and enhancement of international cooperation in technology exchange and export-import operations. Training of top managers and systems analysts able to make strategic decisions in terms of risk, continuous development and improvement of business in a competitive environment.

**Areas of employment for graduates**

Managers of enterprises and structural divisions in the agrarian sphere including enterprises with foreign investments. Managers of enterprises and structural divisions in the agrarian sphere.

**Practical training**

The future graduates in specialty "Administrative management" acquire business knowledge of technological issues at specific enterprises and ability to choose methods and tools of market environment evaluation and develop options for strategic behavior of enterprises. Considering the branch characteristics of master programs, students learn to

apply their knowledge in any situations that may arise in agricultural production. All production problems are solved from the standpoint of organizational and HR aspects.

### Proposed theme of master thesis

1. Outsourcing of human resources in the system of enterprise management.
2. Social aspects of management in agricultural enterprises.
3. Forming strategies of advertising management of an enterprise.
4. Management of crop production at an enterprise.
5. Management of organic production in Ukraine.
6. Management of personnel business career.
7. Enterprise innovation management.
8. Conflict in the context of enterprise management.
9. Product quality management.
10. The system of enterprise labor potential management.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2017;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
<b>1. STANDARTD ACADEMIC DISCIPLINES</b>				
1	Business-management	1	150	5
2	Economics of production	1	150	5
3	Business management and controlling	1	150	5
4	Economic information science & Methodology of social empirical research	1	150	5
6	Business Planning (Planning and organization of an enterprise)	2	150	5
7	Strategies of international agricultural marketing	2	150	5
8	Project management and evaluation	3	150	5
9	Strategic management & Quantitative methods of decision making	3	150	5
<b>Total standard part</b>			<b>1260</b>	<b>42</b>
<b>2. ELECTIVE TRAINING DISCIPLINES</b>				
<b>2.1. Disciplines offered by the university</b>				
1	Agricultural policy	2	150	5
2	Seminar on the preparation of master's thesis (Introduction to scientific work)	3	120	4
3	Business foreign language	1, 2	150	5

MASTER CURRICULA AND TRAINING PROGRAMS

№ n/n	Discipline	Semester	Number of	
			hours	credits ECTS
<b>Total part offered by the university</b>			<b>420</b>	<b>14</b>
<b>2.2. Disciplines chosen by a student</b>				
1.	Modern agrarian technologies	1	150	5
2.	Methods of administrative activity	1	150	5
3.	Cooperative forms of management	1	150	5
4.	Assessment and compilation of balance	1	150	5
5.	Management consulting	2	150	5
6.	Agrotechnical consulting	2	150	5
7.	Concept of regional development	2	150	5
8.	International agribusiness	2	150	5
9.	Method of counseling	3	90	3
10.	Cross-cultural management	3	90	3
11.	Strategies in international business	3	90	3
12.	Automated accounting system	3	90	3
13.	European integration	3	90	3
14.	Chief administrative officer	3	90	3
15.	Management of enterprise activities	3	90	3
16.	Human resources management	3	90	3
<b>Total part chosen by a student</b>			<b>630</b>	<b>21</b>
<b>Total elective part</b>			<b>1050</b>	<b>35</b>
<b>3. OTHER FORMS OF TRAINING</b>				
1	Production and pre-diploma practice	1,2	210	7
2	Writing and defense of master thesis		240	8
<b>Total</b>			<b>450</b>	<b>15</b>
<b>Total in educational program</b>			<b>2700</b>	<b>90</b>

**Annotation of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Business management.** The objective of the discipline is to provide students with knowledge of objective laws, conditions, processes and specific features of economic activity and agricultural development, agricultural trade, and skills of their practical application to determine the optimal organization of an enterprise. Students learn about important for business enterprise management techniques and personnel work, and determine their impact on entrepreneurial success through applied programs and business games.

**Economics of production.** The course provides students with knowledge and skills in practical economics. Students will be able to describe the production and technical alternatives in livestock and crop production, critically analyze and evaluate the results in the context of overall economic and social development. The main aim of the course is to give students knowledge of objective laws, conditions, processes and specific features of economic activity and agricultural development, agricultural trade, and skills of their practical application.

**Business management and controlling.** The main aim of the course is to provide students with systemic knowledge about the use of analytical tools and instruments of accounting, economic analysis and controlling in enterprise management.

**Economic Information science & Methodology of social empirical research.** The objectives of the course are to master basic concepts of computer science, to study computer hardware and software, to acquire practical skills of working on the up-to-date computers, to master modern software packages for solving economic problems, acquire practical skills in computer networks. The students master the methods of scientific

cognition of social research, methods and techniques of solving specific social problems independently.

**Business Planning (Planning and organization of an enterprise).** The discipline provides students with knowledge of basic economic relationships at the level of an enterprise and general production. The main objective of the course, which logically extends the courses in economics of production and business management, is to provide students with knowledge of objective laws, conditions, processes and specific features of economic activity and agricultural development, and acquisition of skills for their practical application in order to determine the optimal organization of an enterprise.

**Strategies of international agricultural marketing.** The main aim of the discipline is to give the theoretical principles of modern strategic marketing management and practical skills to making strategic decisions in the management of marketing activities and development on the foreign and domestic market. The main objectives in the process of teaching are: theoretical training of students and mastering skills in strategic marketing management.

**Project management and evaluation.** The students master the basic concepts and categories, methods and techniques to evaluate selection of decision projects; study the instructional materials in economic planning, the main sources of information in the discipline.

**Strategic management & Quantitative methods of decision making.** The students master the basic concepts, categories and methodological tools of development and implementation of the strategy of the organization. The main aim of the discipline is to develop modern management thinking and the system of expertise knowledge in management, form a conceptual understanding of the basics of systemic organization management; acquire skills of analyzing internal and external environment, make appropriate management decisions. The aim of the discipline is to form the system of theoretical knowledge and practical skills to using mathematical tools in economic studies in modern information environment that enables increase of research effectiveness and reliability of the results, to apply an integrated approach to the analysis of economic processes and management decisions.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by the university

**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.

**Seminar on the preparation of master's thesis (Introduction to scientific work).** The discipline introduces students to the basic methods and techniques of scientific research. Students learn to use scientific approaches in their future activities, exploring important processes and phenomena.

**Business foreign language.** The overall objective of the program of foreign language teaching for specific purposes is to develop students' professional language competences that will contribute to their effective functioning in diverse cultural, educational and professional environment.

### 2.2. Disciplines chosen by a student

**Modern agrarian technologies.** Fundamentals of the use of the organizational mechanism and methods of providing agricultural enterprises with integrated production

services for the implementation of a comprehensive systemic assessment of agricultural production in a particular agrarian enterprise.

**Methods of administrative activity.** The aim of the discipline is to increase the efficiency of organizational structures through the proper use of different levels of management principles and tools by managers, creation of an integrated system of administrative management organization.

**Cooperative forms of management.** Distribution and popularity of cooperative forms of management. Development of different types of cooperatives. Sources of funding. Cooperative principles of activity. Economic Participation of Members.

**Assessment and compilation of balance.** Legal and organizational bases of organization of accounting at the enterprises. Legal and regulatory framework for accounting in enterprises. The economic essence of accounting. Methodical methods and methods of accounting. How to document your account. The order of formation of the reporting forms of enterprises. Legal principles of nature management.

**Management consulting.** The system of professional training aims to provide students with knowledge and skills in organization of management consulting and advisory services, and organization of consulting activities of administrators and managers in agricultural service. Future specialist learn the basic principles and functions of consulting; communication processes in information and advisory service; the effective methods of information sharing; modern information technologies.

**Agrotechnical consulting.** Development of strategies for the development of organizations and their individual units. Management subdivisions of enterprises and organizations of various forms of ownership, state and municipal authorities. Analytical activity. Conduct an assessment of the effectiveness of projects in the light of the factor.

**Concept of regional development.** Determination and assessment of the level of economic development of the region. Forecasting and planning of regional development. Organization of regional management. Development and improvement of organizational structures of management, definition of their main properties and types. Control and regulation of regional development.

**International agribusiness.** The aim of the discipline is to provide students with systemic knowledge of objective laws, conditions, processes and specific features of external economic activities, and skills of their practical use. The objective of the course is to develop students' holistic conception of processes in foreign economic activity and formation of practical skills to use the acquired knowledge about the application of data base for the analysis of the global economic environment in order to choose the strategy of entering foreign markets.

**Method of counseling.** The concept of the communication process. The importance of communication. Factors influencing the communication process. Extension methods: massive, group, and individual. Features of counseling organization Phase consultation process. Using SWOT analysis to diagnose problems.

**Cross-cultural management.** 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 the management of the organization of the patterns of behavior inherent in the national business culture.

**Strategies in international business.** The essence of globalization of the economy and management of international business. Features of the international business environment. Organizational-legal forms of international business. Features of integration of small and medium business. Strategic planning in international corporations. Technology of international investment. Personnel management in international firms.

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**Automated accounting system.** The aim of the discipline is to form complex knowledge and practical skills in the proper theoretical application of accounting using computer technology, to master modern methods of rational use of technical equipment in the workplace of an accountant, explore the prospects of information technologies in agricultural production and the use of new forms and methods of accounting.

**European integration.** Stages of the formation and development of the European Union. The structure and functions of the institutions of the European Union. Policy of the European Union in various sectors of the economy. The policy of the European Union with regard to its citizens. Horizontal policy of the European Union. European Union foreign policy. Ukraine and the EU: the way of integration, problems and prospects of cooperation. Strategy of Ukraine's integration into the European Union. Global problems of the present.

**Chief administrative officer.** The purpose of the discipline is to introduce students to the peculiarities of future profession, its content and objectives of managerial activities, the role of managers of various levels in management of modern enterprises, peculiarities of organization of training specialists for management.

**Management of enterprise activities.** The main aim of the discipline is to develop students' knowledge of the basic principles, main categories, advanced concepts, theoretical principles and practical management of the main business activity, and skills in developing operational strategies, creation and use of branch operational subsystems as the basis for achieving the organization's mission.

**Human resources management.** The aim of the discipline is to form complex theoretical knowledge and practical skills in developing and implementing personnel policies in modern organizations, rational selection of employees for positions and forming effective teams, evaluation and development of workers and purposeful use of their potential.

**Training of masters of sciences  
in branch of knowledge 07 "Management and Administration"  
in specialty 073 "MANAGEMENT"  
educational program "MANAGEMENT OF INVESTMENT ACTIVITY AND  
INTERNATIONAL PROJECTS"**

Form of training:	Licensed number of persons:
– Full-time	40
Duration of Training:	
– educational and professional program	1,5 year
– educational and research program	2 year
Credits ECTS:	
– educational and professional program	90
Language of teaching	Ukrainian, English
Qualification	Specialist of projects and programs management in material (intangible) production; head of project and program in material (intangible) production

**The concept of training**

The training in educational program, which aimed at training professionals to develop investment policies of companies and project management, search international programs and grants and determination of investment sources, are due by the need of agro production in project-managers, coordinators and heads of project, investment managers and analysts, heads of investment departments and investment consultants. The opportunities of writing projects and obtaining diploma in leading educational establishments of Poland and diploma of NULES of Ukraine according to the double degree programs open for students.

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

***Master's program "Management of investment activity"***

The aim of the master's program is preparing of professionals in management investment activities, which able to efficiently develop and substantiate the concept of the project, estimate its effectiveness, taking into account risk factors and uncertainties, perform a feasibility study and develop a business plan, estimate and select the most effective investment instruments, develop calculation and budget of project and provide its implementation, form a project team, control the project realization and manage change.

**Areas of employment of graduates**

Graduates can work as project-managers, coordinators and heads of investment and business-project, investment managers, analysts and consultants, heads of investment departments of enterprises of different economic branch and area of activities, in investment companies and investment departments of large enterprises.

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

#### ***Master's program "Management of investment activity"***

The aim of the master's program is providing of fundamental theoretical and practical training of highly qualified personnel for the professional activities of research and innovation trends in investment activity at the state, territory, region, industry, enterprises.

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

Graduates can continue studies in postgraduate, work teachers in higher educational institutions of II and III accreditation levels and also work as project-managers, coordinators and heads of investment and business-project, investment managers, analysts and consultants, heads of investment departments of Ukrainian enterprises of different economic branch and area of activities, in investment departments of large international companies

#### **Practical training**

Future specialists in projects and programs management in material (intangible) production learn the features of investment activity, acquire practical skills of development -plan project, analysis of the financial state of business entities and determination of investment directions, estimation of quantitative and qualitative characteristics of investment projects, optimization of investment portfolio management, estimation of investment attractiveness and selection of concrete projects by the example of the development of real investment projects.

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

1. Strategic analysis of the factors influencing on investment agricultural sector.
2. The role of government in stimulating investment activity of manufacturing enterprises.
3. Estimation of investment attractiveness of the region (enterprise).
4. Organization of pre-investment researches on organic products market.
5. Modeling investment strategy of agricultural enterprise.
6. Developing of strategic directions and forms of investment activity of enterprise.
7. Planning investment activity of enterprise.
8. Management efficiency of investment activity of corporation.
9. Forming business-strategy of enterprise.
10. Management of investment project implementation at the enterprise.

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

#### ***Master's program "Management of international projects"***

The aim of the master's program is training of specialist in managing international projects, which will possess the knowledge and practical skills of finding information about international programs and grants, preparing and submission project applications and project management on base of using international project standards. The program provides for training of qualified personnel, which able to creative professional activities and implementation of innovative methods in the management international projects.

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

Graduates can work as project-managers, coordinators and heads of international investment and business-project, investment managers, analysts and consultants, heads

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of investment departments of Ukrainian enterprises of different economic branch and area of activities, in international companies.

### Practical Training

Future masters learn the basic requirements for writing and implementation projects, directions grant of international organizations and governments. As potential leaders they learn to manage international projects, gaining knowledge of the practical aspects of finding sources of funding on base of the analysis of international programs and grants, negotiating with potential partners in the difficult investment environment by example of preparing real international projects.

### Proposed Topics for Master Theses

1. International programs and grants as a source of project funding.
2. Development of business-plan of international project for agricultural enterprises.
3. Development of the project for agricultural enterprises.
4. Management of the project cost.
5. Risk management and changes in the project.
6. Management of project realization agricultural enterprise.
7. Development of strategies funding for innovative projects.
8. Financial substantiation of programs at the stage of pre-project researches.
9. Management efficiency of investment projects of agricultural enterprises
10. Risk management in investment projects of agricultural enterprises.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2017;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

### Curriculum of Master training in educational program "Management of investment activity and international projects" (educational and professional program of master's training)

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Investment management	1	120	4
2	Macroeconomic analysis and investment strategy	3	120	4
3	Controlling innovation activity	2	120	4
4	International programs and grants	1	120	4
5	Project approach in business management	3	120	4
6	Financial sources of business projects	1	120	4
7	Management of project and project risks	1	120	4
8	Marketing activities management	2	120	4

**MASTER CURRICULA AND TRAINING PROGRAMS**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
9	Creative technologies in HR management	2	120	4
<b>Total for standard part</b>			<b>1080</b>	<b>36</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by the University</b>				
1	Agricultural policy	1	120	4
2	Methodology and organization of scientific research with the principles of intellectual property	2	120	4
3	Business foreign language	1,2	120	4
<b>Total (Disciplines offered by University)</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Free chose disciplines</b>				
1	Project financing	2	120	4
2	Project management of agroindustrial complex	2	120	4
3	Information systems and technologies in management	2	120	4
4	Financial Analysis	2	120	4
5	Crisis management	2	120	4
6	Social investment	2	120	4
<b>Total part free chose</b>			<b>240</b>	<b>8</b>
<b>2.2.2.1. Master's program "Management of investment activity"</b>				
1	Management of international projects and innovations	2,3	300	10
2	Business game "Investment policy of agro-industrial enterprises"	3	180	6
<b>Total (Disciplines offered by students)</b>			<b>480</b>	<b>16</b>
<b>2.2.2.2. Master's program "Management of international projects"</b>				
1	Business game "Strategic project management"	2,3	300	10
2	Forming, management and development of a project team	3	180	6
<b>Total (Disciplines offered by students)</b>			<b>480</b>	<b>16</b>
<b>Total for elective part</b>			<b>1080</b>	<b>36</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Production practice	2	180	8
2	Preparation and defense of master's thesis	3	300	10
<b>Total</b>			<b>540</b>	<b>18</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotation of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Investment management.** Tasks, functions and organizational providing of investment management. Methods 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.** 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.

**Controlling innovation activity.** Objects of controlling innovation. Budgeting as a tool of operational controlling innovation. Economic calculations in controlling innovation and innovative projects. Methods of management decision making in controlling innovation at enterprise. Development trends of controlling innovation.

**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.

**Financial sources of business projects.** The main groups of financial sources of business-projects. Methods of financing projects international practice. Advantages and disadvantages of project financing. Conditions of sustainability schemes of project financing. Projects with state participation. Public-private partnership. Sources financing of Project Start-Up. Venture funds. Business angels. Financial intermediation. The optimal structure of financing sources of business projects.

**Management of project and project risks.** The essence of project management. Technical and socio-cultural aspects of project management. Main project management processes and their relationships. Project participants. The stages of project development. Planning project costs, methods and means of evaluation. Types, causes and consequences of project risks. Identification, evaluation and methods of risks minimization at different phases of the project. Development of measures for risks minimization.

**Marketing activities management.** Marketing activities management in the system management. Functions of marketing activities management. Trends and concepts of marketing activities management. The marketing activities of the enterprise as a process. Organization and management stages of marketing activities. Tasks and stages of marketing activities organization. The organizational structure of marketing activities management. Cross-functional coordinating of enterprise departments in the implementation of marketing functions. Marketing strategic planning. Control as a means of increasing the efficiency of marketing activities. Managing marketing tools.

**Creative technologies in HR management.** The using of creative technologies in personnel management in the contexts of external and internal environment: organizational culture, climate, socialization and mentoring; development managers in the conditions of globalization. Managing individual factors: social perception, evaluation qualification, skills, mentality, introspection, emotion and attitude to the organization. Motivation: needs, design offices, satisfaction career development. Theories of equality, expectations and establishing goals. The involvement of staff and improve efficiency. Management of group factors and social processes: effective groups and team, decision-making, management of conflicts and negotiations, communication in the era of digital technology. Managing of organization efficiency. Modern leadership: situational, contextual and behavioral theory, transactional and charismatic leaders. Making of creative enterprises, which capable to transformation on base of new experiences and requirements of a competitive business environment.

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## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**Agricultural policy.** The main categories of agricultural policy. State regulation of agricultural production, essence and aims of agricultural policy. The economic consequences of using specific instruments of regulation the domestic agricultural sector. Measures of regulation domestic agricultural markets. Measures of regulation foreign trade of agro-food production. Main approaches evaluation of state support level for the agricultural sector and regulation of the global agro-food system in WTO. Agricultural policy of some foreign countries and blocs (US, EU). Features of forming and main directions of Ukraine agricultural policy.

**Methodology and organization of scientific research with the principles of intellectual property.** Science and research in the world today. Specificity research activities, the types and characteristics of scientific research. Characteristics of general methodology research. Characteristics of the stages and presentation of scientific research results. Information retrieval technologies in the research. Method of preparation and design of publications, technology writing. Intellectual property: concept, features. The main institutions of intellectual property law. Sources of intellectual property law. Objects and subjects of intellectual property law. Personal moral and intellectual rights of property. The using of intellectual property. Protection of intellectual property rights.

**Business foreign language.** Professional lexical and grammatical minimum. Written business communication. Verbal communication within the theme of the program.

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

### 2.2. Disciplines offered by students

#### 2.2.1. Free chose disciplines

**Project financing.** Theoretical fundamentals of project financing. Project financing system. Project management in the system of project financing. Estimation of efficiency of investment projects in the system of project financing. Sources of project financing. Cost and structure of investment resources in project financing. Features of organization of various forms and types of project financing. Banks in project financing. Project financing with the participation of international financial institutions. Features of project financing at the expense of EU funds.

**Project management of agroindustrial complex.** The essence of project management. Features of project management of agroindustrial complex. Main processes in project management and their interconnection. Project participants. Stages of project development. Planning of project cost, methods and means of its estimation. Features of control over implementation of agroindustrial complex projects. Identification, assessment and risk minimization methods at different phases of the project. Development of risk minimization measures. Realization of projects in agroindustrial complex with the support of donor organizations, peculiarities of management.

**Information systems and technologies in management.** The role of information systems and technologies in project management. Methods and methodology of information systems designing in project planning . The system and methodological aspects of modeling in project management. Requirements for the project team, its manager and systems analyst. Structural analysis tools. CASE-technologies. Diagrams data streams. Context diagrams. Professional and non-professional project management systems. Modern software for project management Microsoft Project 2010. Resources project in MS Project. Enhanced functions of MS Project. Primavera software package. ConceptDraw software. MS Visio software. Project Expert Software. CRM systems.

**Financial Analysis.** The content of financial analysis and its functional. Role in the activities of business entities. System of indicators of financial analysis and estimation of their value in the process of making managerial decisions. Analysis of the state and efficiency of the formation of property of the enterprise. Analysis of current assets. Analysis of the structure and dynamics of capital sources of the enterprise. Analysis of cash flows of liquidity and solvency of the enterprise. Analysis of financial sustainability of the enterprise. Mechanism of formation of attracted financial resources of the enterprise. Analysis of the creditworthiness of the enterprise.

**Crisis management.** General concepts of crisis. Classification crises. Cyclical character of the crisis. Methodology recognition crisis. The aim and tasks of crisis management. The sustainability of enterprise and crisis. Transition periods of enterprise development. The crisis as a turning point in development. The control and early signs of a future crisis. The issue of crisis management and differentiation management technologies. Functional and crisis management. Scheme management by crisis. The role of innovation in crisis management. The situational approach to management in a crisis situation. The organization of works to resolve the crisis.

**Social investment.** The role of social investment in the economy. The relationship of socio-economic and investment state policy. Social investment projects. Social projects management. Features financing of social projects. Risks of social investments and methods its minimization. Social investment and social security.

#### ***2.2.2.1. Master's program "Management of investment activity"***

**Management of international projects and innovation.** Basic provisions of development and analysis of international projects. International standards and certification in project management. Planning and preparation of project decisions. The main forms of structure projects. Project financing and management of cost projects. Criteria of efficiency and methods for evaluating of international projects. Management of implementation and quality of international projects. Management of resources distribution and risks in international projects. Characteristics and types of innovation. Factors of impact to innovative activities. Planning of innovative activities The main types of innovative projects. Management of innovative projects. Stages and resource providing for innovative projects. Evaluation of efficiency innovative projects. Features of international innovative projects. The state innovation policy in Ukraine.

**Business game "Investment policy of agro-industrial enterprises".** Business game as a tool modeling of management decisions making as for investment policy forming of agro-industrial enterprises. Creation several teams of players to solve a specific problem as for investment policy forming of agro-industrial enterprises. Search and justification of choice of the best alternatives for investment activity and forming investment strategy of enterprises, determination of their implementation mechanisms. Forming of investment projects portfolio. Evaluation of efficiency investment policy of agro-industrial enterprises. The presentation of the results.

#### ***2.2.2.2. Master's program "Management of international projects"***

**Business game "Strategic project management".** Business game as a tool modeling of management decisions making as for strategic project management. Creation several teams of players as for strategic alternatives forming and justification of choosing one of its in management of specific project. Primary conditions of business game: competitive position of enterprise, trends market of enterprise, the strengths and weaknesses of enterprise and its competitors, determination of competitive advantage and enhancing their opportunities, efficiency of inserting project in development strategy.

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Determination of conditions and variants of resource providing of the project and selecting of the best variant. The presentation of the results.

**Forming, management and development of a project team.** The necessity and principles of a project team forming. Methods and organizational aspects of team forming. The main characteristics of a project team. Organization of team interaction. Psychological features of project team management. Management a international project team. Conflict management.

## 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 212

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

### **Specialty 051 "Economy"**

#### ***Educational program "Economic Cybernetics"***

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" 122 "Computer Science"**

#### ***Educational programs "Information Managing Systems and Technologies" "Computer Ecological and Economic Monitoring" "The Software of Information Systems"***

Graduating department:  
**Computer Sciences**  
Tel.: (044) 527-87-23  
E-mail: iusprog@nubip.edu.ua  
Head of department – Ph.D. in Information Technologies, associate professor Bella Golub

### **Specialty 123 "Computer Engineering"**

#### ***Educational programs "Computer Systems and Networks"***

Graduating departments:  
**Computer Systems and Networks**  
Тел.: (044) 527-81-99  
E-mail: csn@it.nubip.edu.ua  
Head of the department – Ph.D. in Pedagogics, associate professor Dmytro Kasatkin

**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.

***Master's program "Risk assessment in agriculture"***

Risk management is a sub-field of business and management that deals with identifying and preventing possible damaging outcomes within an organization. Risk managers help with the process of decision making in many different areas, such as corporate risk and compliance, cyber and IT risks, workplace safety risks, risk in banking and financial services, regulatory and operation risk management, strategic risk consultancy and legal risk management.

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 for graduates**

The Master's program "Risk assessment in agriculture" 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.

### ***Master's Program "Ecological and Economic Modeling"***

The master's program aims to study the principles of environmental management based on modern modeling approaches to rural development. The basis of the master's program is depth study of optimization methods using objective functions are not limited profit agricultural enterprises and take into account environmental and social aspects of rural development. It is essential to develop analytic and algorithmic thinking for the construction and use of mathematical models and solve real issues of development of Ukrainian agriculture. In addition to optimization techniques much emphasis on statistical methods for processing big dates, that is needed to assess the actual performance of agricultural production and the state of the environment.

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

Masters in "Ecological and Economic Modeling" are detected in the world as analysts of different fields of activity, experts in the field of prediction and simulation of economic and ecological processes. 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 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. 4. Real risks evaluation of agricultural sector crediting.
4. Influence of agriculture manager risk aversion on business structure.
5. Risk assessment of innovation in the agricultural business.
6. Ecological and economic component modeling of the agricultural innovative proceses.
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.

#### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);

5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Business Process Modeling	1	150	5
2	Global Economy	1	120	4
3	Developing of Web applications	2	120	4
4	Applied Econometrics	1	120	4
5	Intellectual Data Analysis	2	120	4
6	Modeling and Forecasting in environmental management	2	120	4
<b>Total for standard part</b>			<b>750</b>	<b>25</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
2	Agrarian Policy	1	120	4
3	Global Information Resources	2	120	4
4	Methodology and organization of research on the basics of intellectual property	1	120	4
<b>Total (Disciplines offered by University)</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1. Master's program "Risk assessment in agriculture"</b>				
1	Electronic Commerce	1	120	4
2	Big Data Analytics	2	120	4
3	Modeling with R	2	120	4
4	Innovation agriculture risk	2	150	5
5	Risk management models	2	150	5
<b>Total (Disciplines offered by students)</b>			<b>660</b>	<b>22</b>
<b>2.2.2. Master's program "Ecological and Economic Modeling"</b>				
1	Electronic Commerce	1	120	4
2	Big Data Analytics	2	120	4
3	Modeling with R	2	120	4
4	Ecological and Economic Risks	2	150	5
5	Models of environmental management	2	150	5
<b>Total (Disciplines offered by students)</b>			<b>660</b>	<b>22</b>
<b>Total for elective part</b>			<b>1020</b>	<b>34</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Internship		180	6
2	Research practice		420	14
3	Preparation and defense of Master's work		330	11
<b>Total</b>			<b>930</b>	<b>31</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

## Annotations of disciplines in the curriculum

### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**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.

**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.

**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.

**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.

### 2. ELECTIVE ACADEMIC DISCIPLINES

#### 2.1. Disciplines offered by University

**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.

## 2.2. Disciplines offered by students

### 2.2.1. Master's program "Risk assessment in agriculture"

**Electronic Commerce.** Introduction to e-business. Place of electronic commerce in the information sector. Information Security in e-business. Payment systems in the Internet. Financial systems in the Internet. Marketing in Electronic Commerce. Advertising in the Internet. Submitting of the web-site to directories and Web-site indexing by search engines. Affiliate programs.

**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.

**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.

**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.

### 2.2.2. Master's program "Ecological and Economic Modeling"

**Electronic Commerce.** Introduction to e-business. Place of electronic commerce in the information sector. Information Security in e-business. Payment systems in the Internet. Financial systems in the Internet. Marketing in Electronic Commerce. Advertising in the Internet. Submitting of the web-site to directories and Web-site indexing by search engines. Affiliate programs.

**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 file system -

rozpodilenoyu 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.

**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.

**Models of environmental management.** Displaying general laws of nature, society and simulation in environmental condition and theoretical knowledge of it; Analysis tools, the methods of quantitative assessment and modeling of environmental management; methodological approaches to research in environmental economics.

**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	Analyst of computer systems, researcher (computing systems)

**The concept of training**

The educational program on this specialty gain knowledge and skills for the development of software; system design and data management, using network solutions, hardware platforms and software products of leading world manufacturers; ability to select programming technology, the relevant needs of specific systems and develop applications in various subject areas; the ability to build efficient computational algorithms; ability to develop integrated information solutions for enterprises and companies, including the design of computer networks, computer systems alternative to the assessment of resources required for their implementation; possession of modern methods of designing programs and software systems, development of optimal solutions for the software, algorithms, procedures and operations.

***Master's program "Data science"***

The main practical purpose of professional activities in the science of data identify patterns in the data, extract knowledge from the data in aggregate form. The object of experts with educational program "Data science" is the development of algorithms; mathematical modeling; design and development of computer information processing technology and research data, provides support to the apparatus of mathematical statistics, artificial intelligence, machine learning, often without downloading data to the model.

**Areas of employment for graduates**

On their workplaces graduates can address issues related to the management and maintenance of complex information systems. In addition, they can analyse 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.

***Master's program "Information Managing Systems and Technologies in agro-industrial and environmental field"***

The concept of this master programs direction is in need of training of specialist with skills of designing, building and managing of information systems by using modern technologies of collaborative development, programming, testing, protection and exploitation of managing information systems. Also, master program aimed to train students to use technologies and methods of system analysis and decision-making during creation of large and complex systems using of artificial intelligence systems and software, and computer automated systems.

**Areas of employment for graduates**

On their workplaces graduates can address issues related to the management and maintenance of complex information systems. In addition, they can analyse 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.

**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.

**Proposed Topics for Master Theses**

1. Corporate knowledge database processing on the example of land cadastre: 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.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;

4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);

5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master's training  
in educational program "Information managing systems and technologies"  
(educational and professional program of master's training)**

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1.	Modelling and forecast in environmental sphere	2	150	5
2.	Object modelling and designing of complex systems	1	120	4
3.	Organization of data warehousing	1	150	5
4.	Development of WEB applications	2	120	4
5.	Safety and reliability of computer systems	2	120	4
6.	Data Mining Technology	2	150	5
<b>Total for standard part</b>			<b>810</b>	<b>27</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1.	Agrarian policy	1	120	4
2.	Methodology and organization of research on the basics of intellectual property	1	120	4
3.	Special sections of mathematics	1	180	6
<b>Total (Disciplines offered by University)</b>			<b>420</b>	<b>14</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1 Master's program "Data science"</b>				
1.	Information systems management	1	120	4
2.	Principles of distributed and network programming	1	120	4
3.	Patterns of object-oriented design and programming	2	120	4
4.	Methods of expert systems	2	150	5
5.	Big Data Technologies	2	150	5
<b>Total for Master's program</b>			<b>660</b>	<b>22</b>
<b>Total for elective part</b>			<b>1080</b>	<b>36</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1	Internship		210	7
2	Research practice		360	12
3	Preparation and defense of Master's work		240	8
<b>Total</b>			<b>810</b>	<b>27</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**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.

**Datacentres Organization.** 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.

**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.

**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.

**Technology Data Mining.** DataMining Technology, Data Mining techniques for solving classification, regression, associative search rules clustering. Use DataMining the construction of analytical systems.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**Special sections of mathematics.** The main aim of this course is to learn more and focus on different mathematical methods and instruments, which be extremely useful in data analysis, modeling and applied monitoring tasks.

#### *2.2.1. Master's program "Data science"*

**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

**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

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development. Special attention is paid to the role of standards of information sharing, storing and visualization.

**Frameworks of object-oriented modeling.** Design patterns that can be implemented in standard object-oriented languages.

**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.

**Training of masters 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	Analyst of computer systems, researcher (computing systems)

**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.

***Master's program "Computer monitoring environmental and economic processes"***

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 for 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.).

**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

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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.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

### Curriculum of Master's training in educational program "Computer ecological and economic monitoring" (educational and professional program of master's training)

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1.	Modelling and forecast in environmental sphere	2	150	5
2.	Object modelling and designing of complex systems	1	120	4
3.	Organization of data warehousing	1	150	5
4.	Development of WEB applications	2	120	4
5.	Data Mining Technology	1	150	5
6.	IT monitoring of environmental and socio-economic processes	2	120	4
<b>Total for standard part</b>			<b>810</b>	<b>27</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1.	Agrarian policy	1	120	4
2.	Special sections of mathematics	1	120	4
3.	Methodology and organization of research on the basics of intellectual property	1	180	6
<b>Total (Disciplines offered by University)</b>			<b>420</b>	<b>14</b>
<b>2.2. Disciplines offered by students</b>				

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>2.2.1. Master's program "Computer monitoring environmental and economic processes"</b>				
1.	RS and technology processing geospatial data	1	120	4
2.	Hardware and software for collecting and processing environmental information	2	120	4
3.	Intellectual environmental monitoring systems	2	120	4
4.	Robot-technic Systems of Management.	2	150	5
5.	Simulation modeling of environmental processes	1	150	5
<b>Total (Disciplines offered by students)</b>			<b>660</b>	<b>22</b>
<b>Total for elective part</b>			<b>1080</b>	<b>36</b>
<b>3. OTHER TYPES OF TRAINING</b>				
1.	Internship		210	7
2.	Research on the topic of master's thesis		360	12
3.	Preparation of Master's work		180	6
4.	Defense of Master's work		60	2
<b>Total</b>			<b>810</b>	<b>27</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

### Annotations of disciplines in the curriculum

#### 1. STANDARD ACADEMIC DISCIPLINES

**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 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.

**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.

**Technology DataMining.** DataMining Technology, Data Mining techniques for solving classification, regression, associative search rules clustering. Use DataMining 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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**Special sections of mathematics.** The main aim of this course is to learn more and focus on different mathematical methods and instruments, which be extremely useful in data analysis, modeling and applied monitoring tasks.

**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.

### 2.2. Disciplines offered by students

#### 2.2.1. Master's program "Computer Monitoring of Environmental Economics"

**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. Describe 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.

**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.

**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).

**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 MSc in Software Engineering

### **The Concept of Learning**

The main focus of this program is providing the quality training for preparing the highly skilled specialists on information technologies and software development. They must be capable to solve hard, complex and non-standard problems (applied, scientific and innovative) in the field of software engineering.

### ***Master Program "The Software of Information Systems"***

This educational program focuses on the development of modern approaches and technologies of software design, development and quality assurance. The program provides problem-oriented lecture courses, as well as project implementation (individual and team projects) within practical and laboratory classes.

### **Graduates Employment Areas**

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"): mentor of IT courses and trainings; software developer; software engineer; software quality control engineer (QA); Information Systems architect; mobile games and applications developer, 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 disciplines provide complex project work, which requires team work on design research and development. Complete projects have to be examined before the commission of the academic group. Faculty provides an opportunity of participation in thematic student conferences, project presentations and startup hackathons.

### **Master's works topics (approximate)**

1. The software of the intelligent classification systems of crop state classification with use of medium resolution satellite data.
2. The software of information system of agricultural works accounting.
3. The Software of the crop area assessment system based on the regression approach.
4. The Software of the monitoring system based on Google Earth app.

5. The Software of the crop monitoring system for mobile devices.
6. The software of the decision support system for poultry administration.
7. The software of the decision support system for the HR department staff on the example of the university and its subdivisions.
8. The Software of the technological process control system of the agro-industrial enterprise with use of artificial intelligence.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

### Curriculum of Master's training in educational program "The Software of Information Systems" (educational and professional program of master's training)

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1.	Global Information Resources	1	120	4
2.	The Methods and Information Technologies for Risk Assessment	2	120	4
3.	Software project management	1	120	4
4.	Organization of data warehousing	1	120	4
5.	Digital processing of signals and images	2	120	4
6.	High-performance computer systems	2	120	4
7.	Software for embedded systems	2	120	4
<b>Total for standard part</b>			<b>840</b>	<b>28</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1.	Agrarian policy	1	120	4
2.	Special sections of mathematics	1	150	5
3.	Methodology and organization of scientific research	1	150	5
<b>Total (Disciplines offered by University)</b>			<b>420</b>	<b>14</b>
<b>2.2. Disciplines offered by students</b>				
1.	The Software legal protection	1	120	4
2.	Content Management	2	150	5
<b>2.2.1 Master's program "System Software"</b>				
3.	The Theory of formal languages and compilation	2	120	4
4.	Programming of Artificial Intelligence Systems	2	150	5
<b>2.2.2 Master's program "Applied Software"</b>				
3.	Information systems management	2	120	4
4.	Robot-technic Systems of Management	2	150	5
<b>Total (Disciplines offered by students)</b>			<b>540</b>	<b>18</b>
<b>Total for elective part</b>			<b>960</b>	<b>32</b>
<b>3. OTHER TYPES OF TRAINING</b>				

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
1	Scientific-pedagogical practice		300	10
2	Research on the topic of master's thesis		300	10
3	Preparation of Master's work		240	8
4	Defense of Master's work		60	2
<b>Total</b>			<b>900</b>	<b>30</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

## Annotations of disciplines in the curriculum

### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**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.

**Software project management.** The main subject if this discipline is the obtaining the theoretical knowledge and practical skills in the methodology of software project management. Task of the discipline:

- to study the theoretical, methodological and organizational foundations of project management;
- familiarization with the: concept of the software project, its elements and their properties, classification and environment of the projects, life cycle of the software project;
- mastering the project structuring models and the process, familiarization with the software projects management functions;
- mastering the management of the main characteristics of the project;
- mastering the project management methods, software tools and computer technologies that are focused on project management;
- acquiring the skills in uasage 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.

**Organization of 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.

**Digital processing of signals and images.** 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 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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**Special sections of mathematics.** The main aim of this course is to learn more and focus on different mathematical methods and instruments, which be extremely useful in data analysis, modeling and applied monitoring tasks.

**Methodology and organization of scientific research.** This discipline is directed to acquire the formation of the modern level of scientific and information culture; the acquisition of systematic knowledge about the essence, nature, structure, patterns, and methodology of scientific research; the development of competencies necessary for the independent pursuit of scientific research and the acquisition of new knowledge, processing, and presentation of the results performed scientific work, masters preparation for professional activities. Students will get acquainted with the concepts of the quality of scientific research, scientific novelty, ethics in science, plagiarism and the principles of combating it, as well as requirements for the main types of scientific and qualification work. Particular attention is paid to the practical trainings and the ability to use a systematic approaches in planning, organizing and conducting research, in finding and processing scientific information, analyzing information sources and summarizing the obtained materials, interpreting the results of scientific research and formulating conclusions. The discipline provides the development of skills directly related to the preparation, design, and protection of master's qualification papers.

### 2.2. Disciplines offered by students

**The Software legal protection.** The teaching of discipline is aimed to provide to students all systematic information on the legal protection of intellectual property in the field of information technologies, peculiarities of Ukrainian legislation in the field of copyright protection of computer programs and technical solutions. Students will gain

knowledge of the general legal requirements and approaches that are used when creating and using intellectual property. They get acquainted with the principles and methods of processing applications for obtaining certificates that are protected by copyright for computer programs, and a patent that protects technical solutions. During their training, students gain skills in the practical application of regulatory documents in the field of computer software and industrial property protection, search and use of information about intellectual property objects. As a result, competencies are formed that are necessary for the development of documents that are part of the application for the issuance of security documents for computer programs, as well as methods of effective interaction with the expertise in the process of considering applications filed.

**Content Management.** Web Content Management - an industry that has become more relevant with the rapid development of the WWW network. Therefore, this discipline introduces to future specialists the requirements and rules for the creation, operation and maintenance of content of Web sites and large portals with the help of automation of the process of organizing and managing their information content. This course highlights the main existing content management systems - CMS-systems. CMS (WCMS), a Web-content management system, is a software that automates the processes of creating and maintaining Web sites. To create such systems, the course focuses on the use of modern approaches to the creation of content of Web sites and major portals, the basis of the methodology of modeling and development of software systems and software quality assurance.

### ***2.2.1. Master's program "System Software"***

**The Theory of formal languages and compilation.** Familiarization with the classical section of mathematical linguistics and theoretical informatics is the theory of formal languages. The generative grammars, the classification of formal languages, regular expressions, finite automata, stationary automata, algorithmic problems associated with context-free grammars are considered in this course. Students will study the methods and algorithms for constructing the main parts of the translators and interpreters.

**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.

### ***2.2.2. Master's program "Applied Software"***

**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.

**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.

**Training of masters of sciences  
in branch of knowledge "Information technologies"  
in specialty "COMPUTER ENGINEERING"  
educational program "COMPUTER SYSTEMS AND NETWORKS"**

Form of Training:	Licensed number of persons:
- Full-time	25
Duration of Training	
- full-time of educational and professional program	1,5 years
Credits	240 ECTS
Language of Teaching	Ukrainian
Qualification	Professional in the field of computing systems

**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 electronic computing equipment hardware and software.

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.

***Master's program "Computer systems and networks protection technologies"***

The main practical purpose of professional activity in the field of creation of protection systems [n computer systems and networks is the development of hardware and software of protection systems and maintenance of such systems during professional activity. The subject of the activities of specialists of the Master's program "Computer systems and networks protection technologies" is the development of hardware and software of systems for information protecting in computer systems and networks.

**Areas of employment for graduates**

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.

### ***Master's program "Internet of Things"***

The concept of the Master's program consists in the training of specialists capable of designing, creating and maintaining the hardware and software of specialized computer systems and IoT devices using modern technologies of computer systems designing.

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

The graduate can analyze the problem area at the system and structural levels of designing and solution the issues related to the development and maintenance of both separate subsystems and the whole complex of specialized computer devices IOT. Graduates of this master's program can work in positions: computer systems analyst, computer systems engineer, computer systems designer, programmer engineer, system programmer, 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.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№ п/п	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Theory and design of computer systems and networks	1	120	4
2	Computer systems programming technologies	1	120	4
3	Information protection in computer systems and cyber security	1,2	240	8
4	Visualization and pattern recognition systems	2	120	4
5	Intellectual data analysis	2	120	4
6	Scientific practice	3	180	6
7	Preparation and Defence of Master's Thesis	3	720	24
<b>Total for standard part</b>			<b>1620</b>	<b>54</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines offered by University</b>				
1	Agrarian policy	1	120	4
2	Methodology of research	1	120	4
3	Computer systems of artificial intelligence	1	150	5
<b>Total (Disciplines offered by University)</b>			<b>390</b>	<b>13</b>
<b>2.2. Disciplines offered by students</b>				
<b>2.2.1 Master's program "Internet of things"</b>				
1	Robotic operating systems	1	150	5
2	Technologies of IOT systems designing	2	120	4
3	Protocols for data transferring in IOT systems	2	120	4
4	Information technologies for monitoring and simulation of the environment	2	120	4
5	Practical training in designing of IOT systems	3	180	6
<b>2.2.2. Master's program "Computer systems and networks protection technologies"</b>				
1	Administration and protection of databases and data warehouses	1	150	5
2	Computer methods of analysis and design of information security electronic means	2	120	4
3	Comprehensive systems of authorized access to information	2	120	4
4	Technologies of administration and operation of protected information and communication systems	2	120	4
5	Practical training in designing of information protection systems	3	180	6
<b>Total for Master's program</b>			<b>690</b>	<b>23</b>
<b>Total (Disciplines offered by students)</b>			<b>1080</b>	<b>36</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

## Annotation of disciplines in the curriculum

### 1. STANDARD ACADEMIC DISCIPLINES

**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.

### 2. ELECTIVE ACADEMIC DISCIPLINES

#### 2.1. Disciplines offered by University

**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.

**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.

## 2.2. Disciplines offered by students

### 2.2.1. Master's program "*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.

### 2.2.2. Master's program "*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. 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.

## **FACULTY OF HUMANITIES AND PEDAGOGY**

**Dean** – Professor Vasyl' Shynkaruk, Doctor of Philological Sciences

Tel.: (044) 527-80-83

E-mail: pedagogy\_dean@twin.nubip.edu.ua

Location: Academic Building 3, Room 101

The faculty organizes and coordinates the educational and training process for Master of Science students of the following specialties:

### **Speciality 231 "Social work"**

#### ***Educational program "Social work"***

Graduate department of:

**Social Pedagogy and Information Technologies in Education**

Tel.: (044) 527-80-73

E-mail: socpedagogy@ukr.net

Head of Department – Associate professor Lesya Viktorova, Doctor of pedagogical sciences

### **Speciality 035 "Philology"**

#### ***Educational program "English and other foreign language"***

Graduate Department of:

**Germanic languages and translation**

Tel.: (044) 527-85-95

E-mail: krgm@ukr.net

Head of Department – Professor Oleksandr Malykhin, Doctor of Pedagogical Sciences

#### ***Educational program "German and other foreign language"***

Graduate Department of:

**Foreign Philology and Translation**

Tel.: (044) 527-88-46

E-mail: kifip@ukr.net

Head of Department – Professor Svitlana Amelina, Doctor of Pedagogical Sciences

### **Speciality 073 "Management"**

#### ***Educational program "Management of Educational Institution"***

Graduate Department of:

**Teaching Methods and Management of Educational Institution**

Tel.: (044) 527-83-56

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

Head of Department – Associate professor Mykola Pryhodi, Doctor of Pedagogical Sciences

**Speciality 011 "Educational science"**

***Educational program "Pedagogy of Higher School"***

Graduate Department of:

**Pedagogy**

Tel: (044) 527-83-55

E-mail: pedagogic@ukr.net

Head of Department – Associate professor Ruslan Sopivnyk, Doctor of Pedagogical Sciences

**Training of masters of sciences  
branch of knowledge "Social work"  
in specialty 231 "SOCIAL WORK"  
in educational program "SOCIAL WORK"**

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	social educator

### **The Concept of Training**

The training of social educators is determined by the state's demand for specialists engaged in social and educational assistance, support, protection and rehabilitation of all categories of children and youth. Professional activity of specialists in Social Pedagogy includes finding solutions for social and educational problems connected with the process of socialization of children and young people; organizing their social protection; consulting on social and educational issues; organizing their leisure activities; assisting in education to those whom it may concern.

#### ***Master's program "Social and Pedagogical Activity in Rural Areas"***

The need for training social educators for rural areas is determined by a low level of social development of rural children. It requires strengthening an impact of psychological specific technology for educational work with rural children and youth, as well as introducing modern research outcomes in the existing rural community. These approaches are implemented in Master's degree program *Social and Educational Activity in Rural Areas*.

The mentioned program involves the study of a complex of subjects aiming to organize the professional social and educational work that focuses on social and educational assistance, support, protection and rehabilitation of rural children and youth. The obtained qualification provides graduates with employment in preschool and secondary schools, centers of children education, cultural centers and art schools, social services and educational clubs, children and community organizations; children custody and services for minors; special closed-type institutions for children; governmental centers and social work services, centers of social protection and assistance, employment centers, institutions of preventive education and penitentiary system etc.

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

Alumni can work for different functional social organizations of all ownership types, as well as for educational, cultural, scientific, consulting organizations and institutions, at subdivisions of the state and municipal departments on family and youth issues: as pension inspectors; researchers (social protection, social sphere); teachers-methodologists; university academic staff; researchers (in other fields of study); lecturers; teachers of professional educational institutions; methodologists; state inspectors,

supervisors of centers, associations, clubs; directors of social services and centers; consultants of specialized services centers; analysts.

### **Practical Training**

Practical training is carried out according to the educational process schedule directly on authorized practice bases, including: district centers of social services for families, children and youth; departments on work with street children; education and health centers; local centers of social services; preschool educational institutions; schools of I-III levels; social and psychological rehabilitation centers.

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

1. Peculiar Features of Social and Educational Work with Children with Special Needs in Rural Areas.
2. Peculiar Features of Leisure Activity Organization for Adolescents in Rural Areas.
3. Preparation of Rural Youth for Family Life.
4. Training Social Educators for Work with Rural Youth at Social Services Centers for Children, Family and Youth.
5. Social and Pedagogical Conditions of Resocialization of Juvenile Offenders from Rural Areas in Penitentiary System Centers.
6. Peculiar Features of Social and Educational Work for Child Rights Protection in Rural Areas.
7. Peculiar Features of Social and Educational Activity of Social Services Centers for Children, Family and Youth with Orphans and Children Deprived of Parental Care in Rural Areas.
8. Forms of Organization of Social and Educational Work with Risk Group Children in Rural Areas.
9. Organization of Leisure Activities for Teens in Recreation Zones in Rural Areas.
10. Peculiar Features of Communicative Activities of Social Educators Working with Rural Youth.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

Course code	Course	Semester	Number	
			hours	
<b>1. PRE-REQUISITE COURSES</b>				
1	Social work in Ukraine and organization of social services functioning	1	240	8
2	Legislative basis for social and educational activity and basics of intellectual property	1	120	4
3	Social support for families	2	120	4
4	Psychopedagogical therapy	2	120	4
5	University pedagogy	1	240	8
6	Social and education systems management and management of social educational work	2	240	8
<b>Total for the compulsory component</b>			<b>1080</b>	<b>36</b>
<b>2. Elective courses</b>				
<b>2.1. University elective courses</b>				
1	Social policy	1	120	4
2	Methodology and organization of researches	2	120	4
3	Business foreign language	2	120	4
<b>Total for the university elective courses</b>			<b>360</b>	<b>12</b>
<b>2.2. Students elective courses</b>				
1	Work organization with different types of social groups	2	120	4
	Practical social work in laboratories			
	Innovative technologies in social work			
2	Language culture and business communication	1	120	4
	Technologies of projection and evaluation of social work			
	Verification of psychological and sociological instruments			
3	Advertising and information technologies in social sphere	1-2	180	6
	Information technologies in social and educational researches			
4	Director of the educational establishment	1	180	6
	Agriculture policy			
<b>Total by students elective courses</b>			<b>600</b>	<b>20</b>
<b>Total for the elective component</b>			<b>960</b>	<b>32</b>
<b>3. OTHER TYPES OF COURSES</b>				
1	State examination		30	1
2	Preparation and defense of Master's project		390	13
3	Practical training		240	8
<b>Total</b>			<b>660</b>	<b>22</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

**Annotations of the disciplines in the curriculum**

**1. STANDARD ACADEMIC DISCIPLINES**

**Social work in Ukraine and organization of social services functioning.**

Theoretical bases, contents and organization of social work, forms and methods of social work with different categories of clients, moral principles of activity and ethic standards of social worker's behavior. Problems of social welfare of the youth and family. Pedagogic theory on principles, contents, methods and ways and means of social work of social services.

**Legislative basis for social and educational activity and basics of intellectual**

**property.** Characteristics of basic laws on social and educational work, theoretical and practical problems of the law on social and pedagogical activity.

**Social support for families.** Technology of social support for families, its aims and objectives, organization of family social support of different types./Social and pedagogical rehabilitation. Concept of “Social and pedagogical rehabilitation”. Social and educational measures, forms, methods and technologies facilitating recovery of social links and functions lost by a child (person). Filling life support environment, increasing care about it.

**Psychopedagogical therapy.** Psychological testing, psychological correction, psychological consulting and psychotherapy, psychological culture of thinking./Rehabilitation psychology. General concept of rehabilitation, its essence and types. Basic concepts of rehabilitation. Subject and objectives of rehabilitation psychology and phases of rehabilitation process. Basic principles of execution of the rehabilitation programme and stages of identification of the rehabilitation programme.

**University pedagogy.** Basic problems of pedagogy in higher educational institutions: peculiarities of the learning process, basics of teaching, technologies of teaching, education, development and socialization of personality, pedagogical procedures of the learning process.

**Social and education systems management and management of social educational work.** Social and pedagogical peculiarities of the management of the system of education, management styles and communication, programme of improvement managerial activity.

## 2. ELECTIVE COURSES

### 2.1. University elective courses

**Social policy.** History of establishment and development of social policy. Theoretical bases of formation and implementation of social policy. Tools of social policy. History of social policy. Civilization and social policy. Social policy, its tools and institutions. Society structure and social reforms.

**Methodology and organization of researches.** Social and educational research, methods of research, organization of research, research results processing.

**Business foreign language.** Acquiring knowledge and skills as to reading professional and scientific literature, communication in the mode “manager-subordinate”, “subordinate-manage”, text annotation.

### 2.2. Students elective courses

**Work organization with different types of social groups.** Current problems of work organization with different types of social groups. Methods of work, planning and organization of the social pedagogue’s activity.

**Practical social work in laboratories.** Aspects of practical social work in the laboratories, contents and methods of work in them.

**Innovative technologies in social work.** Social political innovations including new forms of public movements and political parties, providing aid to the homeless, pensioners, children, healthcare organizations etc.

**Language culture and business communication.** Communication as a social phenomenon, functions of communication. Importance of non-verbal communication in business relations, forms and styles of business communication, requirements to communication.

**Technologies of projection and evaluation of social work.** Application of modern project approach in solving social problems, orientation at final results with minimum time and money spent.

**Verification of psychological and sociological instruments.** Scientific normative and methodic materials as to the execution of one of the necessary areas of psychological service work.

**Advertising and information technologies in social sphere.** Peculiarities of using advertising and information technologies in social sphere. Strategies and technologies of social worker's interaction with mass media. Peculiarities of advertising activity of the social workers and establishments.

**Information technologies in social and educational researches.** Peculiarities of using information technologies in sociopedagogic researches. Programmes on measurement and calculation of statistical data.

**Director of the educational establishment.** Management of educational establishment. Responsibility of the director for educational, administrative and other types of activities.

**Agriculture policy.** System of measures concerning development of economy agriculture sector the government executes in the area of aricultural relations, connected with using land as the basic means of production in agriculture; component of the general economic policy of the state.

**Training of masters of sciences  
branch of knowledge "Human sciences"  
in specialty 035 "PHILOLOGY (GERMAN LANGUAGES AND LITERATURE)  
(INCLUDING TRANSLATION)"  
in educational programs "ENGLISH AND OTHER FOREIGN LANGUAGE",  
"GERMAN AND OTHER FOREIGN LANGUAGE"**

Form of Training:	Licensed number of persons:
– full-time	50
– extramural	50
Term of study	
– full-time educational and professional program	1,5 year
– Part-time	1,5 year
Credits	90 ECTS
Language of teaching	Ukrainian, German, English
Qualification of graduates	philologist-researcher, translator (German/English), teacher of higher educational institution

### **The Concept of Training**

The training of philologists-researchers, translators and foreign language teachers of higher educational institutions is determined by the state's demand for specialists engaged in translation and interpreting of scientific literature in agrobiolgy, environmental protection, economics, 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.

### ***Master's degree program "Translation Activity in Agroindustrial and Environment Protection Branches"***

The Master's degree program combines the study of the theoretical and methodological foundations of translation, linguistic and social bases of translation, discourse features of scientific and technical communication (agricultural aspect) in foreign and native languages; assimilation of models and algorithms for translation process, taking into account the peculiarities of the industry; mastering the ways of adequate reproduction of various types of terminology that is typical for professional agricultural literature; overcoming translation difficulties with verbal and extralinguistic factors; integrative development of all types of speech activity of the dominant pragmatic, intercultural and professional competence; formation and improvement of translation competence in the areas of agriculture and the environment.

According to the program, Master of Science students are trained to be competent in professional activities that require general humanitarian education and socio-economic, psychological, pedagogical and professional knowledge. The educational content provides the cycle of humanitarian, social and economic training (intellectual property, rhetoric, professional labour protection, civil protection, intercultural communication, Ukrainian language for translation), professional and practical training (pedagogy of higher school, psychology of higher education, teaching methodology of translation in higher education, methodology and organization of scientific research, communication strategies of the first foreign language, communication strategies of the second foreign language, theory of translation, translation techniques (the first foreign language), translation techniques (the

second foreign language), information technology in translation activity, comparative typology of the first foreign and Ukrainian languages, actual problems of translation, translation editing of texts on agricultural issues, interpretation and translation of specialized texts).

Master degree students in Translation are also prepared as researchers who are able to do research in linguistics, translation, literature, present research outcomes on translation and foreign philology at different levels. Moreover, they get education as specialists in implementing social and cultural communication (activities outside educational institutions: communication with native speakers, etc.); organizing and conducting educational work with students at higher educational institutions).

### **Employment of Alumni**

Alumni can work as translators at different organizations and institutions and as teachers of German and English languages at higher educational institutions of I-IV levels of accreditation.

### **Practical Training**

Practical training is carried out according to the educational process schedule directly on authorized practice bases, including: institutions and enterprises of agricultural and environmental profiles of all forms of ownership that have departments of translation; research institutes and laboratories, higher educational institutions of I-IV levels of accreditation.

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

1. Editing Texts on Landscape Architecture and Forestry after Automated Systems Translation.
2. Structural and Semantic Characteristics of Terms in Veterinary Sanitarian Expertise, Sanitation, Hygiene and Animal Production in the Aspect of Translation.
3. Contextual Solution of Polysemy of Term Units in the Texts on Production in Pig, Sheep and Horse Breeding.
4. Typology of Business Correspondence in the German and Ukrainian languages.
5. Principles of Legal Terminology Reproduction of Foreign Codes in Land Management and Land Law in the Ukrainian Language.
6. Diachronic Aspects of Professional Terminology Research.
7. Structural Analysis of Terminology Clusters in Texts on Physiology, Pharmacology and Immunology of Animals in the Aspect of Translation.
8. Typology of Stylistic Means in English Advertising Texts on Agricultural and Consumer Issues.
9. Transformation of Syntax Constructions in Texts on Agricultural Management, Marketing and Information Support of the AIC.
10. English-Ukrainian Translation of Official and Business Documentation for International Trade, Exchange Activities and Agricultural Economics.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;

4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);

5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational programs "English and other foreign language",  
"German and other foreign language"  
(educational and professional program of master's training)**

№	Discipline	Semester	Number	
			hours	credits
<b>1. COMPULSORY ACADEMIC DISCIPLINES</b>				
1	Pedagogy and Psychology of Higher School	1, 2	120	4
2	Methods of Teaching Translation at Higher School	1	120	4
3	Communication Strategies of the First Foreign Language	1, 2	240	8
4	Translation Theory	1	180	6
5	Text Linguistics	1	120	4
6	Translation Techniques (the First Foreign Language)	2	240	8
7	Communication Strategies of the Second Foreign Language	1, 2	210	7
<b>Total compulsory part</b>			<b>1200</b>	<b>40</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines chosen by University</b>				
1	Methodology and Organization of Scientific Research with Fundamentals of Intellectual Property	1	120	4
2	Rhetoric and Cross-Cultural Communication	2	120	4
3	Comparative Typology of the First Foreign and Ukrainian Languages	1	120	4
4	Head of the Educational Institution	1-2	120	4
<b>Total part chosen by University</b>			<b>390</b>	<b>16</b>
<b>2.2. Disciplines chosen by students</b>				
<b>Master of professional "Degree Programme Specialization Social and Pedagogical Activity in Rural Areas"</b>				
1	Information Technologies in Translation	2	120	4
2	Translation Techniques (the Second Foreign Language)	1, 2	180	6
3	Interpretation and Translation of Specialized Texts (Horticulture and Forestry; Ecology and Agronomy; Veterinary Medicine and Animal Science; Agrarian Law; Quality, Standardization and Certification Of Production; Agricultural Machinery, Agricultural Mechanization and Electrification)	2	90	3
<b>Total part chosen by students</b>			<b>480</b>	<b>16</b>
<b>Total elective part</b>			<b>960</b>	<b>32</b>
<b>3. OTHER FORMS OF TRAINING</b>				
Introductory (professional) internship			60	2
Practical training (assistance)			90	3
Practical training (translation and technology)			60	2
Practical (graduate) training			60	2
State examination in Theory and Practice of Translation (the first foreign language)			30	1
State examination in Theory and Practice of Translation (the second foreign language)			30	1

№	Discipline	Semester	Number	
			hours	credits
	Master's thesis preparation and defense		210	7
	<b>Total</b>		<b>720</b>	<b>24</b>
	<b>Total for educational programs</b>		<b>2700</b>	<b>90</b>

### Annotations of the disciplines in the curriculum

#### 1. COMPULSORY ACADEMIC DISCIPLINES

**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.

**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 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.

**Text Linguistics.** History of translation and development of theoretical views on it. Lexical and grammatical peculiar features of sentence structures in Ukrainian while translating from a foreign language.

**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.

**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.

#### OPTIONAL ACADEMIC DISCIPLINES

##### *Optional Section 1 (Disciplines chosen by the University)*

**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.

**Rhetoric and Cross-Cultural Communication.** Basic concepts of classical rhetoric. Kinds of eloquence. Rhetoric at different historical stages. Patriotic rhetoric. Oratory of the Kievan state. The main sections of classic oratory. Breathing and speech techniques of speakers, their appearance and personality features. Peculiar features of modern oratory. Development of new forms and oratory methods in the modern mass media.

**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.

**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.

### ***Optional Section 2 (Disciplines chosen by students)***

**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.

**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.

**Interpretation and Translation of Specialized Texts (Horticulture and Forestry; Ecology and Agronomy; Veterinary Medicine and Animal Science; Agrarian Law; Quality, Standardization and Certification Of Production; Agricultural Machinery, Agricultural Mechanization and Electrification).** Consecutive interpretation of German texts on horticulture and forestry, ecology and agronomy, veterinary medicine and animal science, 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  
branch of knowledge "Menedment and Administration"  
in speciality 073 "MANAGEMENT"  
in educational program "MANAGEMENT OF EDUCATIONAL INSTITUTION"**

Form of Training:	Licensed number of persons:
– full-time	25
– extramural	25
Term of study	
– full-time(educational and professional program)	1,5 year
– Part-time	1,5 year
Credits	
– educational and professional curriculum	90
Language of teaching	Ukrainian
Qualification of graduates	manager of enterprise, institution and organization (for education and practical training)

**The Concept of Training**

The training of managers of enterprises, institutions and organizations (for education and production training) is determined by the state's demand for specialists who perform designing and optimization of organization structure of educational institutions; management of its educational and economic activity; control of the given tasks; elaborating the personnel policy of the educational institution and those who study there.

***Master's degree program "Management Activity at Comprehensive Educational Institutions"***

The Master's degree program aims to train future specialists in planning and organization of work in comprehensive educational institutions, managing the educational and economic activity of comprehensive educational institutions, controlling the given tasks, elaborating human resources policy of comprehensive educational institutions and those who study there. Specialist preparation includes theoretical and practical training and combined classroom work and work at the very place of practice, which allows graduates to adapt to their future workplaces.

**Employment of Alumni**

Alumni qualified as managers of enterprises, institutions and organizations (for education and production training) may work at comprehensive educational institutions (comprehensive schools) on positions of headmasters, educational center directors, managers of out-of-school establishments.

***Master's degree program "Management Activity at Technical Schools"***

The Master's degree program aims to train future specialists in planning and organization of work at technical schools, managing the educational and economic activity of technical schools, controlling the given tasks, elaborating human resources policy of educational institutions and those who study there. Specialist preparation includes theoretical and practical training and combined classroom work and work at the very place of practice, which allows graduates to adapt to their future workplaces.

### **Employment of Alumni**

Alumni qualified as managers of enterprises, institutions and organizations (for education and production training) may work at technical schools (comprehensive schools) on positions of headmasters of technical schools, heads (of training production centers; training centers), heads (of training schools, educational centers, extension service), heads of training divisions, departments, sectors.

### ***Master's degree program "Management Activity at Higher Educational Institutions"***

The Master's degree program aims to train future specialists in planning and organization of work at higher educational institutions, managing the educational and economic activity of higher educational institutions, controlling the given tasks, elaborating human resources policy of educational institutions and those who study there. Specialist preparation includes theoretical and practical training and combined classroom work and work at the very place of practice, which allows graduates to adapt to their future workplaces.

### **Employment of Alumni**

Alumni qualified as managers of enterprises, institutions and organizations (for education and production training) may work at higher educational institutions on positions of: heads of higher educational institutions; heads (of courses, extension service, training center); chiefs of departments, practice bases, laboratories; supervisors of student design engineering (research) bureaus.

### **Practical Training**

Practical training is carried out according to the educational process schedule directly on authorized practice bases, including comprehensive educational institutions (comprehensive schools), technical schools and higher educational institutions of I-IV levels of accreditation.

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

1. Management of Technical School Using Innovative Technologies.
2. Organization of Technical School Management.
3. The Content and Peculiarities of Comprehensive School Management.
4. Company Culture of Technical School Staff.
5. Formation of Managerial Culture of Technical School Manager.
6. Information Support for Management of Educational Process at Higher Educational Institutions of I-II Levels of Accreditation.
7. Education Quality Management at Higher Educational Institutions in Norway.
8. Systematic Approach to Innovation Management of Research Universities.
9. The Content and Peculiarities of Human Resources Management at Technical Schools.
10. The System of Effective Human Resources Management at Comprehensive Schools.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
  - 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
-

- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational programs "Management of Educational Institution"  
(educational and professional training program)**

№	Discipline	Semester	Number	
			hours	credits
<b>1. COMPULSORY ACADEMIC DISCIPLINES</b>				
1	Financial and Economic Activity Management	2,3	210	7
2	Human Resources Management	1	180	6
3	Psychology of Management	3	120	4
4	Manager of Educational Institution	1, 2	150	5
5	Management and administration	2	180	6
6	Management of Education and Training	2	120	4
7	Information Technologies in Education and Automated Systems for Educational Institution Management	1	180	6
<b>Total compulsory part</b>			<b>1140</b>	<b>38</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines chosen by University</b>				
1	Business Foreign Language	2	120	4
2	Methodology and Organization of Scientific Research with Fundamentals of Intellectual Property	3	120	4
3	Strategic management Education Technologies	3	120	4
<b>Total part chosen by University</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines chosen by students</b>				
<b>2.2.1. Master's degree program "Management Activity at Comprehensive Educational Institutions"</b>				
1	Pedagogy and educational technologies	1, 2	180	6
2	Management Technique	2	210	7
	Quality of education			
	Education abroad			
	Administrative management			
3	Organization of Comprehensive Educational Institution Activity	3	120	4
<b>Total elective part</b>			<b>510</b>	<b>17</b>
<b>2.2.2. Master's degree program "Management Activity at Technical Schools"</b>				
1	Pedagogy and educational technologies	1, 2	180	6
2	Management Technique	2	210	7
	Quality of education			
	Education abroad			
	Administrative management			
3	Conflictology	3	120	4
<b>Total elective part</b>			<b>510</b>	<b>17</b>
<b>2.2.3. Master's degree program "Management Activity at Higher Educational Institutions"</b>				
1	Pedagogy and educational technologies	1, 2	180	6
2	Management Technique	2	210	7
	Quality of education			
	Education abroad			
	Administrative management			
3	Modern Software and Online Technologies in Education	3	120	4

№	Discipline	Semester	Number	
			hours	credits
<b>Total elective part chosen by university</b>			<b>510</b>	<b>17</b>
<b>Total part chosen by students</b>			<b>510</b>	<b>17</b>
<b>Total elective part</b>			<b>870</b>	<b>29</b>
<b>3. OTHER FORMS OF TRAINING</b>				
Practical training			<b>210</b>	<b>7</b>
Master's thesis preparation and defense			<b>480</b>	<b>16</b>
<b>Total</b>			<b>690</b>	<b>23</b>
<b>Total for the educational programs</b>			<b>2700</b>	<b>90</b>

### Annotations of the disciplines in the curriculum

#### 1. COMPULSORY ACADEMIC DISCIPLINES

**Financial and Economic Activity Management.** Estimates of institution activity, evaluation criteria for decision making, technology of decision making management on financial, economic and business issues of educational institutions.

**Human Resources Management.** The system of labor potential formation of quality labor potential, motivation of labor potential. Systems for monitoring and evaluating the effectiveness of methods and results of organization management (companies, institutions) for different types of ownership.

**Psychology of Management.** The main problems of the concept, general principles, structure, functions, methodology, current trends of management psychology.

**Manager of Educational Institution.** The constituent documents of educational institution, state registration and state regulation of educational institution activity, types and procedures of legal liability, the system of education regulations, laws and regulations on safety management and civil protection. Organizational principles of educational institution top manager work, duties and responsibilities of educational institution administrative service, management of disciplinary relations, institution management technology.

**Management of Educational Institution.** The concept and essence 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. Leadership and leadership. Business ethics. Management of the labor collective. Management of labor resources. Self-management. World experience of personnel management.

**Management and administration.** General theory of the system of education, organizational plan, methods and tools for information modeling management processes and systems, building effective organizations.

**Management of Education and Training.** Contingent formation, excluding and reenrollment, organization of educational and training process at educational institution, educational activities plans, decision-making procedures and criteria for assessing the quality and effectiveness of the educational process in the institution.

**Information Technologies in Education and Automated Systems for Educational Institution Management.** The place and role of information technologies in education, organizing training and education, organizational principles of information technologies in research, construction and planning of information systems for research.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines chosen by University

**Business Foreign Language.** Formation of knowledge and skills in reading professional and scientific literature, conducting conversations in the “manager-subordinate” mode, “subordinate -manager” mode, abstracts and text annotation.

**Methodology and Organization of Scientific Research with Fundamentals of Intellectual Property.** Characteristics of the main regulative and legal documents on intellectual property, theoretical and practical issues of legal organization of scientific research.

**Strategic management.** Studies the process of external environment estimation, organization targets formulation, making decisions aimed at creating and keeping competitive advantages which are able to make business profitable in long-term perspective.

### 2.2. Disciplines chosen by students

**Pedagogy and educational technologies** Theoretical and practical issues of teaching process organization (didactics), education management. . Theoretical foundations of educational technologies, history of educational process, technology, developmental education, project-based learning, interactive technologies in education, educational technology and creative personality development.

**Management Technique.** The tasks of the course are to introduce students to various forms and methods of organizational culture, dealing with people in the management process, promote humanistic purposes of management.

**Quality of education.** Studies balanced correspondence between certain qualification level (secondary, professional and technical, higher schools etc ) and numerous requirements, targets, conditions, confirmed educational rules and standards and also discovering reasons for breaking correspondence and management of the process of established quality improvement.

**Education abroad.** Studies the peculiarities of formation, development and existence of the system of education abroad.

**Administrative management.** Criteria for evaluation of personnel, evaluation and monitoring of institution performance regarding its objectives, organizational activities, plans for future, types and activities of educational institutions, educational institution development strategy.

**Organization of Comprehensive Educational Institution Activity.** Scientific principles of educational institution management, control service at educational institution, organizing the technical work, research, compilation and sharing advanced experience.

**Conflictology.** Tolerance formation for people, interaction strategies in conflict situations, basics of conflict prevention, conflict resolution techniques.

**Modern Software and Online Technologies in Education.** The place and the role of modern software and online technologies in education, organizational principles of modern software and online technologies in education.

**Training of masters of sciences  
branch of knowledge "Education"  
in speciality 011 "EDUCATIONAL AND PEDAGOGICAL SCIENCES"  
in educational program "PEDAGOGY OF HIGHER SCHOOL"**

Form of Training:	Licensed number of persons:
– full-time	50
– extramural	50
Term of study	
– full-time (educational and professional programme)	1,5 year
– full-time (educational and scientific programme)	2 years
– Part-time	1,5 years
Credits	
– educational and professional curriculum	90
– educational and scientific curriculum	120
Language of teaching	Ukrainian
Qualification of graduates	teacher of higher educational institution

### **The Concept of Training**

The training of academic staff for higher educational institutions is determined by the state's demand for specialists who are competent to be engaged in work on the organization of the educational process, methodical and scientific work at colleges and higher schools, initiate special activities to motivate social development of students of higher educational institutions.

#### ***The Master's degree program "Methods of Teaching the Cycle of Agrobiological Disciplines"***

The Master's degree program provides future professionals with mastering a complex of subjects, studying historical aspects of theory and methods of teaching disciplines of the cycle of professional and practical training; rules, principles, forms, methods and means of training courses in agronomy and their content, system of control and assessment of learning performance; improvements, design and content of disciplines modules; theory and methods of practical training, planning and organization of the educational and training process at higher school; theory and practice of pedagogical education.

### **Employment of Alumni**

Alumni qualified as teachers of higher educational institution may work as assistants, teachers of higher educational institutions of different accreditation levels (technical schools, colleges, higher schools, institutes).

#### ***The Master's degree program "Methods of Teaching the Cycle of Economic and Information Disciplines"***

The Master's degree program provides future professionals with mastering a complex of subjects, studying historical aspects of theory and methods of teaching disciplines of the cycle of professional and practical training; rules, principles, forms, methods and means of training courses in economics of enterprise and their content, system of control and assessment of learning performance; improvements, design and content of disciplines modules; theory and methods of practical training, planning and

organization of the educational and training process at higher school; theory and practice of pedagogical education.

#### **Employment of Alumni**

Alumni qualified as teachers of higher educational institution may work as assistants, teachers of higher educational institutions of different accreditation levels (technical schools, colleges, higher schools, institutes).

#### ***The Master's degree program "Methods of Teaching the Cycle of Social Sciences and Humanities"***

The Master's degree program provides future professionals with mastering a complex of subjects, studying historical aspects of theory and methods of teaching disciplines of the cycle of professional and practical training; rules, principles, forms, methods and means of training courses in social pedagogy and their content, system of control and assessment of learning performance; improvements, design and content of disciplines modules; theory and methods of practical training, planning and organization of the educational and training process at higher school; theory and practice of pedagogical education.

#### **Employment of Alumni**

Alumni qualified as teachers of higher educational institution may work as assistants, teachers of higher educational institutions of different accreditation levels (technical schools, colleges, higher schools, institutes).

#### ***The Master's degree program "Methods of Teaching the Cycle of Technical and Technological Disciplines"***

The Master's degree program provides future professionals with mastering a complex of subjects, studying historical aspects of theory and methods of teaching disciplines of the cycle of professional and practical training; rules, principles, forms, methods and means of training courses in mechanization for agriculture and their content, system of control and assessment of learning performance; improvements, design and content of disciplines modules; theory and methods of practical training, planning and organization of the educational and training process at higher school; theory and practice of pedagogical education.

#### **Employment of Alumni**

Alumni qualified as teachers of higher educational institution may work as assistants, teachers of higher educational institutions of different accreditation levels (technical schools, colleges, higher schools, institutes).

#### ***The Master's degree program "Methods of Teaching the Cycle of Animal Science and Veterinary Medicine Disciplines"***

The Master's degree program provides future professionals with mastering a complex of subjects, studying historical aspects of theory and methods of teaching disciplines of the cycle of professional and practical training; rules, principles, forms, methods and means of training courses in veterinary medicine and their content, system of control and assessment of learning performance; improvements, design and content of disciplines modules; theory and methods of practical training, planning and organization of the educational and training process at higher school; theory and practice of pedagogical education.

### **Employment of Alumni**

Alumni qualified as teachers of higher educational institution may work as assistants, teachers of higher educational institutions of different accreditation levels (technical schools, colleges, higher schools, institutes).

### **Practical Training**

Practical training is carried out according to the educational process schedule directly on authorized practice bases, including higher educational institutions of I-III accreditation levels (technical schools, colleges, higher schools, institutes).

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

1. Personality Formation of Future Specialist in Environmental Protection and Agricultural Higher Educational Institutions on the Basis of the National and Patriotic Values.

2. Formation of Leadership Skills of Students of Life Science and Agricultural Higher Educational Institutions.

3. Organization of Student Governance at Higher Educational Institution.

4. Educational Methods of Educators at Student Accommodation.

5. The Ways of Development of Pedagogical Skills for Future Academic Staff of Higher Educational Institutions.

6. Activation of Scientific and Learning Activities of Students While Studying Professional Disciplines.

7. Methods of Game Classroom Activities While Teaching Professional Disciplines.

8. Methods of Academic Performance Control for Students While Studying Professional Disciplines.

9. Methods of Student Self-Education Organization While Studying Professional and Training Disciplines at Agricultural Higher Educational Institution.

10. Problematic Teaching While Studying Professional Disciplines.

### **Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);

2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);

3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;

4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);

5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

**Curriculum of Master training  
in educational programs "Pedagogy of Higher School"  
(educational and professional training program)**

№	Discipline	Semester	Number	
			hours	credits
<b>1. COMPULSORY ACADEMIC DISCIPLINES</b>				
1	Introduction to Specialty	1	120	4
2	Pedagogy of high school	1	180	6
3	Developmental and Pedagogical Psychology	1, 2	210	7
4	Principles of Scientific Research in Pedagogy	1	120	4
5	History of Pedagogy and Development of Higher Education in Foreign Countries	1	120	4
6	Principles of Pedagogical Skills and Ethics for Academic Staff of Higher School	2	120	4
7	Organization of Educational Work at Higher Education Institutions	2	120	4
8	Information Technologies in Education	2	210	7
<b>Total compulsory part</b>			<b>1200</b>	<b>40</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines chosen by University</b>				
1	Business Foreign Language	1	120	4
2	Methodology and Organization of Scientific Research with Fundamentals of Intellectual Property	1,2	120	4
3	Educational technologies	2	120	4
<b>Total part chosen by University</b>			<b>360</b>	<b>12</b>
<b>2.2. Disciplines chosen by students</b>				
1	Professional Training	1	120	4
<b>2.2.1. Master's degree program "Methods of Teaching the Cycle of Agrobiological Disciplines"</b>				
1	Methods of Teaching the Cycle of Agrobiological Disciplines	2	360	12
<b>2.2.2. Master's degree program "Methods of Teaching the Cycle of Animal Science and Veterinary Medicine Disciplines"</b>				
1	Methods of Teaching the Cycle of Animal Science and Veterinary Medicine Disciplines	2	360	12
<b>2.2.3. Master's degree program "Methods of Teaching the Cycle of Technical and Technological Disciplines"</b>				
1	Methods of Teaching the Cycle of Technical and Technological Disciplines	2	360	12
<b>2.2.4. Master's degree program "Methods of Teaching the Cycle of Economic and Information Disciplines"</b>				
1	Methods of Teaching the Cycle of Economic and Information Disciplines	2	360	12
<b>2.2.5. Master's degree program "Methods of Teaching the Cycle of Social Sciences and Humanities"</b>				
1	Methods of Teaching the Cycle of Social Sciences and Humanities	2	360	12
<b>Total for the master program</b>			<b>480</b>	<b>16</b>
<b>Total elective part</b>			<b>840</b>	<b>28</b>
<b>3. OTHER FORMS OF TRAINING</b>				
Practical training			360	12
Master's thesis preparation and defense			300	10
<b>Total</b>			<b>660</b>	<b>22</b>
<b>Total for the educational programs</b>			<b>2700</b>	<b>90</b>

## Annotations of the disciplines in the curriculum

### 1. COMPULSORY ACADEMIC DISCIPLINES

**Introduction to Specialty.** Development of the main tasks and functions for university lecturers, requirements for their personality and organization of work.

**Pedagogy of high school.** Theoretical and practical issues of teaching process organization (didactics), education management (school organization and management).

**Developmental and Pedagogical Psychology.** Peculiarities of psychological, personal development of human at different stages of life, learning and using psychological capacities of educator, pupil (student) while training, educating, mastering of social experience.

**Principles of Scientific Research in Pedagogy.** Pedagogical research, methods of research, organization of scientific research, processing of research findings, teaching experiment.

**History of Pedagogy and Development of Higher Education in Foreign Countries.** Development of theory and practice of education and teaching from ancient times to the present, in different historical periods and under socio-economic formations.

**Principles of Pedagogical Skills and Ethics for Academic Staff of Higher School.** Content of professional and educational work of university lecturer, components of pedagogical skills, conditions and means of formation of educational technology, development of pedagogical abilities and skills.

**Organization of Educational Work at Higher Education Institutions.** Theoretical and methodological foundations of organization of the educational process, structure of education methods, selection and content of education, organization of educational work at university.

**Information Technologies in Education.** The place and role of information technologies in education, organizational principles of using information technologies in education, the structure of information systems and scientific research planning.

### 2. ELECTIVE ACADEMIC DISCIPLINES

#### 2.1. Disciplines chosen by University

**Business foreign language.** Formation of knowledge and skills for reading of professional and scientific literature, conducting conversations in the mode "teacher-student", "leader-subordinate", "subordinate-manager", annotation and text summarization.

**Legal Framework for Educational Institution.** The constituent documents of educational institution, state registration and state regulation of educational institution activity, types and procedures of legal liability, the system of education regulations, laws and regulations on safety management and civil protection.

**Educational technologies.** The technological approach to education, student-centered educational technologies, analysis of leading contemporary educational technology.

#### 2.2. Disciplines chosen by students

**Professional Training.** The main theoretical and practical problems of organization (area of knowledge of basic higher education) in the state and abroad.

##### *2.2.1. Master's degree program "Methods of Teaching the Cycle of Agrobiological Disciplines"*

**Methods of Teaching the Cycle of Agrobiological Disciplines.** Methods of teaching as an academic discipline. Objectives, goals, place and content of agrobiological

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disciplines. Educational and methodological support for educational and training process. Organization of student educational work. Criteria, norms and measures of student learning performance assessment and evaluation. Methods of preparing and conducting lectures and practical classes, as well as laboratory work. Organization of student self-education. Preparing and assisting during practical training and internship. Organization of course projects.

**2.2.2. Master's degree program "Methods of Teaching the Cycle of Animal Science and Veterinary Medicine Disciplines"**

**Methods of Teaching the Cycle of Animal Science and Veterinary Medicine Disciplines.** Methods of teaching as an academic discipline. Objectives, goals, place and content of animal science and veterinary medicine disciplines. Educational and methodological support for educational and training process. Organization of student educational work. Criteria, norms and measures of student learning performance assessment and evaluation. Methods of preparing and conducting lectures and practical classes, as well as laboratory work. Organization of student self-education. Preparing and assisting during practical training and internship. Organization of course projects.

**2.2.3. Master's degree program "Methods of Teaching the Cycle of Technical and Technological Disciplines"**

**Methods of Teaching the Cycle of Technical and Technological Disciplines.** Methods of teaching as an academic discipline. Objectives, goals, place and content of technical and technological disciplines. Educational and methodological support for educational and training process. Organization of student educational work. Criteria, norms and measures of student learning performance assessment and evaluation. Methods of preparing and conducting lectures and practical classes, as well as laboratory work. Organization of student self-education. Preparing and assisting during practical training and internship. Organization of course projects.

**2.2.4. Master's degree program "Methods of Teaching the Cycle of Economic and Information Disciplines"**

**Methods of Teaching the Cycle of Economic and Information Disciplines.** Methods of teaching as an academic discipline. Objectives, goals, place and content of economic and information disciplines. Educational and methodological support for educational and training process. Organization of student educational work. Criteria, norms and measures of student learning performance assessment and evaluation. Methods of preparing and conducting lectures and practical classes, as well as laboratory work. Organization of student self-education. Preparing and assisting during practical training and internship. Organization of course projects.

**2.2.5. Master's degree program "Methods of Teaching the Cycle of Social Sciences and Humanities"**

**Methods of Teaching the Cycle of Social Sciences and Humanities.** Methods of teaching as an academic discipline. Objectives, goals, place and content of social sciences and humanities. Educational and methodological support for educational and training process. Organization of student educational work. Criteria, norms and measures of student learning performance assessment and evaluation. Methods of preparing and conducting lectures and practical classes, as well as laboratory work. Organization of student self-education. Preparing and assisting during practical training and internship. Organization of course projects.

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## EDUCATION AND RESEARCH INSTITUTE OF CONTINUING EDUCATION

**Director** – PhD, Professor, Honored Economist of Ukraine Kulayets Mariya

Tel.: (044) 259-79-11

E-mail: pdv1204@ukr.net

Location: building № 10, room 219

Education and research institute of continuing education organizes and coordinates educational process of master training in educational program within specialtie:

### **Specialty 073 "Management"**

#### ***Educational program "Extension service"***

Graduating department:

**Extension and Tourism Department** Tel.:(044) 527-80-61

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

Head of Department – Doctor of Economics, Professor Kalna-Dubinyuk Tetyana P.

#### ***Educational program "Management of Innovative Activity"***

Graduating department:

**Public administration and Management of Innovative Activity**

Tel.:(044) 527-86-58

E-mail: inpoagro@gmail.com

Head of Department – Doctor of Economics, Professor Vytvytska Olga D

**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	25
– Part-time	25
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	Adviser in Extension

**The concept of training**

The relevance of preparing Masters in specialty 073 "Management" educational program "Extension service" is due to the fact that in market conditions only those succeed who introduces innovations doing today what others will think tomorrow. For Ukraine to train highly qualified specialists in extension service is a new direction that will ensure the dissemination of knowledge and information on innovative areas of agricultural production and conservation ecology of the environment, social development of the village, children, youth, families, new technologies for competitive production, life extension on earth. The program introduces lecturers from leading universities in Europe and America to study the organization of information and consultancy activities on the basis of its actual programs, creation of consulting structures.

**Areas of employment of graduates**

Master in management and adviser in extension may hold positions in management of enterprises and organizations, consulting centers, consulting organizations, advisory branches of the central government and regional authorities, extension services, have a job as managers in advisory services in various fields including in agriculture, social sphere, organizing advisory services for the development of rural areas, children, youth, families and open private consulting firms.

**Practical training**

The objective of practical training is to train professionals who are able to organize information and consulting activities in the current market conditions and know the techniques and methods of dissemination of knowledge and information for the development of competitive enterprises. The bases of practical training are developed advisory organizations and enterprises, advisory centers, advisory structure of central government and regional authorities in Ukraine and abroad - Poland, Hungary, the Netherlands, Portugal, America and so on.

**Proposed Topics for Master Theses**

1. The development of agricultural extension service in Ukraine.
2. PR-consulting in the field of rural tourism.
3. Training programs in agricultural extension service.
4. Information and consulting service for soybean growing technology

5. Advisory service of the agro-industrial company.
6. Advisory service to use innovation technologies in rural area.
7. Information and consulting service of alternative energy sources using in agriculture.
8. The organization of the advisory service to transform biotechnologies in crop production.

### Academic rights of applicants entering Master course

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Organization of extension service	1	120	4
2	Financial management	2	150	5
3	Intellectual property.	1	150	5
4	PR- consulting in agriculture	2	90	2
5	Risk management of agroindustrial production	3	180	6
6	Information systems and technology of management	1	120	4
7	Rights of advisory service	1	120	4
8	Management consulting in agriculture	1	120	4
9	Statistical modeling and forecasting in the management extension service	2	120	4
10	Innovation management	1	180	4
<b>Total for standard part</b>			<b>1350</b>	<b>45</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines chosen by University</b>				
1	Agricultural policy	2	120	4
2	Business Foreign Language	1	120	4
3	Scientific research methodology	1	90	3
4	Organizing training in extension	2	90	3
<b>Total (Disciplines offered by University)</b>			<b>420</b>	<b>14</b>
<b>2.2. Disciplines offered by students*</b>				
<b>2.2.1. Master's program "Organization and Development of Advisory Service in Agrarian Sphere of Economy"</b>				
1	Extension in Agribusiness	3	150	5
	Planning information and consulting programs			
2	Agricultural extension service	3	150	5
	Stability Theory Agricultural Systems			
3	Information and consulting service for sustainable	3	180	6

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
	development			
	Extension Services in Green Tourism			
4	International Extension Services	3	180	6
	Ethic of extension service			
<b>Total (Disciplines offered by students)</b>			<b>660</b>	<b>22</b>
<b>Total for elective part</b>			<b>2430</b>	<b>81</b>
<b>3. OTHER FORMS OF TRAINING</b>				
1	Production Practice	2	90	3
2	Preparation and defense of master's work	3	180	6
<b>Total</b>			<b>270</b>	<b>9</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

\*Disciplines offered by students - 22 Credits ECTS

## Annotations of disciplines in the curriculum

### 1. STANDARD ACADEMIC DISCIPLINES

**Organization of extension service.** Academic discipline aims to study the theory and practice of information and consulting activities in the world and features its formation and developing in Ukraine, organization extension services firm, basic principles and methods of management, financing, staffing and consultation process, licensing and certification extension activities.

**Financial 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.

**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.

**PR- consulting in agriculture.** Academic discipline aims to explore theoretical and methodological and practical issues of public relations in a market economy and its role in consulting, technology concept of the public and their use in crisis situations.

**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 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.

**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.

**Rights of advisory service.** Academic discipline aims to explore theoretical and methodological and practical issues of public relations in a market economy and its role in consulting, technology concept of the public and their use in crisis situations.

**Management consulting in agriculture.** 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.

**Statistical modeling and forecasting in the management extension service.** Academic discipline provides theoretical and practical knowledge of modeling and forecasting in extension, identify the most pressing problems and determination of the basis of the main directions of development of information and consulting service.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**Business foreign language.** The course involves the formation of Competence in Business English skills in the area of extension.

**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.

**Organizing training in extension.** Academic discipline involves exploring the theory and methodology of adult education, learning teaching methods, organization of training events and feedback evaluation.

### 2.2. Disciplines offered by students

#### 2.2.1. Master's program *"Organization and Development of Advisory Service in Agrarian Sphere of Economy"*

**Extension in Agribusiness.** Academic discipline aims to develop modern knowledge and practical skills in advisory activity in the agribusiness as an independent, at your own risk activity for the production of agricultural products, works, information and extension services for profit, development and evaluation of agribusiness, farms, householdplots etc., carried out by individuals and legal persons registered as subjects of agricultural entrepreneurship by law.

**Planning information and consulting programs.** The course involves the study of information and consulting programs in their planning to meet the needs of agricultural production and the public to raise the level of knowledge, innovation, competitive production development in extension.

**Agricultural extension service.** Academic discipline aims to theoretical knowledge and practical skills for development of agricultural extension services in Ukraine, to master the basics of information and consultancy activities, its programs, models, methods, technologies.

**Stability Theory Agricultural Systems.** Discipline involves mastering the theoretical basis of formation, appearance and functioning of agricultural systems in

general and in particular; structure and properties of systems. The principles of sustainability agroecosystem field crops, especially through knowledge of biology and plant physiology, requirements for environmental factors, patterns of size and quality of the crop. It is creating a scientific basis for the rational use of biological resources, forecasting changes in the biosphere through anthropogenic factor.

**Information and consulting service for sustainable development.** Discipline involves the formation of a system of theoretical and practical knowledge of the rules of sustainable rural development and the consulting role in this. International experience.

**Extension Services in Green Tourism.** The course aims to provide theoretical knowledge and practical skills of organizing extension services in green tourism, its legal, ecological and economic characteristics aimed at solving social problems in rural areas.

**International Extension Services.** Academic discipline provides theoretical and practical knowledge about the role of extension in developed countries, its programs, methods and models of development, peculiarities of information and extension activities in terms of climate change on Earth.

**Ethics of extension service.** Discipline involves the formation of a system of theoretical and practical knowledge of rules of advisory activity, business and diplomatic protocol, modern methods and business rules adopted in the world.

**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	25
– Part-time	25
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, LLC "Companies with foreign investments "Auris" 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. Information systems in the company's innovation management.

4. Formation the strategy of innovative development of enterprises
5. Management commercialization of innovative products the agricultural sector.
6. Management logistics costs of enterprises in the implementation of innovative enterprises.
7. Management of international innovation projects.
8. Management of innovation development personnel.

**Academic rights of applicants entering Master course**

Applicants to graduate can continue their education:

- 1) based on the acquired ED "Bachelor" in a related specialty (Table. 2);
- 2) based on the acquired ED "Bachelor" in nonrelated specialty (with additional entrance tests) (Table. 3);
- 3) based on the acquired ED "Bachelor" in any specialty (with additional entrance tests) according to the list of specialties of admission rules to NULES Ukraine in 2018;
- 4) by concurrent full-time study in related specialty (see item 1) and part-time study in nonrelated specialty (see items 2);
- 5) by concurrent full time study (see items 2) in nonrelated specialty and part-time study in related specialty (see item 1).

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

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
<b>1. STANDARD ACADEMIC DISCIPLINES</b>				
1	Economics of innovative enterprises	1	150	5
2	Financial management	2	150	5
3	Management consulting in agriculture	1	120	4
4	System analysis and management decisions	2	150	5
5	Information systems and technology of management	1	120	4
6	Intellectual property	1	150	5
7	Technology transfer	2	120	4
8	Marketing innovation	2	150	5
9	Innovation management	1	120	4
10	International management	3	120	4
<b>Total for standard part</b>			<b>1350</b>	<b>45</b>
<b>2. ELECTIVE ACADEMIC DISCIPLINES</b>				
<b>2.1. Disciplines chosen by University</b>				
1	Scientific research methodology	1	150	5
2	Agricultural policy	2	150	5
3	Business Foreign Language	1	120	4
<b>Total (Disciplines offered by University)</b>			<b>420</b>	<b>14</b>
<b>2.2. Disciplines offered by students*</b>				
<b><i>Master's program "Management Innovative Activity of Enterprises in Agrarian Sector of Economy"</i></b>				
1	Innovation projects management	2	180	6
	Logistical support of innovation			
2	Risk management of agroindustrial production	3	180	6
	Organization of innovative small businesses			
3	HR management in innovation	3	150	5
	Innovation providing			
4	Strategic management of innovative development	3	150	5
	Quality management and certification of agricultural			

№	Name of Academic Discipline	Semester	Number	
			hours	credits ECTS
	products			
<b>Total (Disciplines offered by students)</b>			<b>660</b>	<b>22</b>
<b>Total for elective part</b>			<b>1080</b>	<b>36</b>
<b>3. OTHER FORMS OF TRAINING</b>				
1	Production Practice	3	90	3
2	Preparation and defense of master's work		180	6
<b>Total</b>			<b>270</b>	<b>9</b>
<b>Total for educational program</b>			<b>2700</b>	<b>90</b>

\*Disciplines offered by students - 22 Credits ECTS

## Annotations of disciplines in the curriculum

### 1. STANDARD ACADEMIC DISCIPLINES

**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.

**Financial 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.

**Management consulting in agriculture.** 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.

**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.

**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.

**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.

**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.

**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 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.

**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.

## 2. ELECTIVE ACADEMIC DISCIPLINES

### 2.1. Disciplines offered by University

**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.

**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.

**Business foreign language.** The course involves the formation of Competence in Business English skills in the area of extension.

### 2.2. Disciplines offered by students

#### *Master's program "Management Innovative Activity of Enterprises in Agrarian Sector of Economy"*

**Innovation projects management.** Knowledge and skills acquiring of innovative projects management using the tools in the management of innovation projects, the examination of innovative projects and programs.

**Logistical support of innovation.** Establishing of modern knowledge about the nature and content of logistic support innovation, practical skills concerning logistics solutions support innovation, evaluation and selection of the optimal solution for the initial conditions to ensure the effective operation of the company.

**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 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 innovative small 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 in creating and managing the operation of small innovative companies and other business units.

**HR management in innovation.** Acquiring by students theoretical knowledge on effective management of labor collective of innovative enterprises on the basis of scientific

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principles and methods developed by domestic and foreign experts, and positive experience of advanced 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

**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.

**Quality management and certification of agricultural products.** Knowledge and skills formation on quality management of innovation activities of enterprises. System quality innovative enterprises.

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