GENERAL TRAINING CYCLE
Compulsory components of EPP

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

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

Both national and foreign experience is studied. In case of mastering the material students get the possibility to form their own view on professional base about processes and phenomena happening in agrarian sector of the state economy.

Special Sections of High Mathematics. The main sections of high mathematics needed for research and development of electro-technologies in agriculture. Mathematical methods for solving linear and nonlinear differential equations. Matrix, operating methods. Functional series. Basic theory of random functions.

Calculations of economic efficiency of scientific developments. The feasibility of implementing scientific developments needs the calculation of economic efficiency, which should be evaluated from different perspectives. Varieties of techniques in different conditions are offered. The basis of the discipline is estimation calculations, the risks and feasibility of projects. Statistical methods, methods of expert analysis and calculations of investments are proposed.

Safety in the Area. Safety measures in normal and emergency modes of electrical installations. Safety during installation, repair and maintenance of electrical installations. Lightning agricultural facilities.

SPECIAL (PROFESSIONAL) TRAINING CYCLE
Compulsory components of EPP

Automated Accounting of Energy and Material Resources. Concepts and Models: object, class, data, methods, access inheritance properties. Systems of objects and classes. Designing object-oriented programs: methods and algorithms. Object-oriented languages, classification, architecture, expressive means, technology application. Interface: The rules of the organization, methods and programming tools. Object-oriented systems, methods, language and methods of programming

Features of computer modeling of systems of automation of biotechnical objects. Methods of computer-modeling systems (KMS). Structure and function of KMS. Gathering and processing information. Mathematical modeling. Algorithms of optimal and adaptive management. Implementation of control functions. Examples KMS in agriculture.

Automation of biotechnical objects: automation of technological processes. Specifications processes as facilities management and their disturbances. Principles of automated process control systems. Automation of technological processes in crop and livestock production.

Automation of biotechnical objects: automated process control systems. Principles of control systems. Information channels and their characteristics. Identification of control objects. Algorithms management. Technical means of automation. Reliability and economic efficiency of automation.

Computer aided design systems for automation of biotechnical objects.

Basic concepts and definitions. Basic concepts of electrification systems and process automation. General information about agricultural processes. Technical support of CAD. Software of CAD. Databases of CAD. Statistics and dynamics of technological objects control. Regulatory impact and organs. Automation of technological devices.

Installation, adjustment and operation of automation systems of biotechnical objects. Installation of automation circuits. Operation of equipment automation systems. Adjustment of sensors, controllers, actuators of automated control systems. The procedure for putting into operation mounted systems. Formation and organization of instrumentation and automation means in agricultural enterprise.

Artificial intelligence in automation systems of biotechnical objects. Basic concepts of neural networks. The properties of the neural network training. Hopfield neural networks. Basic concepts of fuzzy logic. uzzy sets and fuzzy neural networks.

Robotic Complex and Systems. Design and simulation tasks, principles, algorithms control robotic systems and systems. Appointment, classification and objectives robotic control systems. Structure, key components of robotic control systems. Intelligent robotic systems. The system of perception and recognition information. Keeping system knowledge, problem solving and forming control actions. The system of environmental impact. Principles of robots and robotic systems. System design, manufacturing, robotics control systems. Possibilities of robots and robotic systems in the agro-industrial complex.

Optional components of EPP

Optional Block by specialty

Optional Block 1 "Computer-Integrated Process Control Systems and production"

World experience of methods and means of modern automated process control. Modeling of technical and biological objects under uncertainty: Kharkiv random processes. Statistical modeling of random processes. Decision making under uncertainty using gaming techniques. Creating and working databases. Software. Technical support of intelligent systems.

Features of modeling of computer-integrated systems of automation of biotechnical objects. Principles of construction of control system. Information channels and their characteristics. Identification of facilities management. Algorithms management. Technical means of control system. Reliability and economic efficiency of control system.

Modeling and Identification of Biotechnical Objects in Agriculture. A classification of technological processes and objects of automatic control. Methods of constructing static and dynamic objects agricultural processes and industries.

Protection of information in automation systems. The basic concepts of information protection in automation systems, principles of construction of complex information protection systems are considered, typical vulnerabilities of systems are noted, the analysis of systems for security is carried out and normative documents of information protection in automation systems are defined. Legal, organizational and technical methods of information protection are determined. This provides an opportunity to gain practical skills in the application of modern technologies for information security in automation systems.

Optional Block 2 "Internet of Things"

Design of Internet systems of Things. Regulatory documents for the design of the Internet of Things are considered, the structure of the Internet of Things is analyzed, an algorithm for the operation and programming of devices is developed, an algorithm for information exchange, protocols for the implementation of connections between devices and their programming environment are described. The choice of Internet of things according to the technical characteristics is made taking into account the operating conditions. Technical is implemented on the basis of simulation software and using a set of technical means Arduino, Raspberry, Schneider, ARIES.

Cloudy Technology. Basic information on the emergence, development and use of cloud technologies, typologies of cloud resource deployment (private, public, hybrid,

public, etc.) is considered. Methods and features of designing cloud services, advantages and disadvantages of cloud computing models and solutions based on them are studied. You get the skills to develop applications for major platforms. The expediency of transferring existing applications to the cloud environment is determined, the efficiency of application and long-term prospects are assessed. Issues of security, deployment, backup in the context of cloud infrastructure are considered. An overview of current solutions of cloud computing market leaders (Amazon, Microsoft and Google, etc.).

Maintenance of the Internet of Things. The architecture of the Internet of Things is analyzed, the technical means used for its implementation, their structure, the principle of operation and software for debugging are given. Particular attention is paid to network devices, their configuration to provide communication with the global network.

Internet of Things programming. Development of software and hardware systems and computer intelligent systems of the Internet of Things. The software of the Internet of Things, features of programming of the Internet of things, features of development of the software for a network exchange, protocols of wireless network exchange of management of devices of the "Internet of Things" are considered; operating systems for Internet of Things; low-level and high-level software development languages (C ++, C #, Java and others); cloud services, information security of the Internet of Things; software documentation requirements.