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GROKAZ
DEVELOPMENT OF BACHELOR PROGRAM IN AGROECOLOGY WITH DUAL EDUCATION IN KAZAKHSTAN

EP 6B05221 "Agroecology"

EP 6B05221 "Agroecology" is an innovative dual education program is being implemented in three universities of Kazakhstan: Kostanay Engineering and Economics University named after M. Dulatov (KEnEU), Toraighyrov University (ToU), and Kazakh National Agrarian Research University - KazNARU.

Distinctive features of the educational program:

- completion of semester and course projects on specific enterprise cases with the involvement of industry mentors;
- industrial practices;
- dual education;
- early employment (combining study and work in the 3rd and 4th year).

Terms of study:

- based on general secondary education - 4 years (full-time);
- based on technical and professional education - at least 2.5 - 3 years (full-time and dual);
- based on higher professional education - at least 1.5 - 2 years in a blended learning format.

Academic mobility:

internal: KazNARU, KazATU named after Seifullin, Shakarim University, and others;
external: European countries - Serbia, Croatia, Greece.

Diploma: Bachelor of Agriculture in Agroecology
Language of instruction: Russian, Kazakh, English
Areas of education: 6B05 Natural sciences, mathematics and statistics
Training direction: 6B052 Environment
Group of educational programs: B051 Environment
Unified National Testing (UNT) subjects: Biology and Geography

About dual education

Dual education is the preparation of skilled workers based on close interaction between enterprises and educational institutions: students learn a profession on the job from trained specialist masters.

The dual system solves two tasks at once: it combines both theoretical and practical training in the educational process. Simultaneously with their studies, students master their chosen profession directly in production, that is, they study in two places at once: 1-2 days a week at the university, the rest of the time - at the enterprise.

For the enterprise, this is an opportunity to prepare personnel precisely "to order", ensuring their maximum compliance with all its requirements, saving on costs for searching and selecting workers, their retraining and adaptation. Moreover, there is an opportunity to select the best students, because their strengths and weaknesses become obvious over three years. This approach motivates students to learn not for the sake of ticking boxes. Newcomers can work immediately at full capacity and productivity, they know the life of the enterprise well and feel at home there.

All of this contributes to the retention of personnel and a reduction in turnover, which is important for production.

Participation in personnel training positively affects the company's reputation and its image as an employer in the labor market. It retains the right to choose and decides whether to organize training.

For young people, this is a great chance to gain independence early and adapt to adult life painlessly. During their studies, they receive monetary rewards for their work at the enterprise, and after its completion - a job for which they are well prepared. The dual system ensures a smooth entry into work activity, without the inevitable stress for other forms of education caused by a lack of information and weak practical training. It not only allows you to learn to perform specific job duties but also develops the ability to work in a team, forms social competence, and responsibility.

For the state, the task of training qualified personnel for the sectors of the economy is effectively solved. In addition, it has the competence to exercise legal control and cooperate with regional chambers on vocational training issues.

About the program

The "Agroecology" educational program is developed in accordance with the National Qualifications Framework, agreed with the Dublin descriptors and the European Qualifications Framework, and is designed based on a modular system of studying disciplines that form general cultural and professional competencies.

A unique feature of the "Agroecology" educational program is also that it is interdisciplinary and lays the foundations necessary for the sustainable and environmentally friendly development of agriculture, as the production basis for the development of rural areas.

Agroecology includes the following professions according to the "Atlas of new professions and competencies of Kazakhstan":

Major program:

Entrepreneurship module;

Microqualification at choice:

Seed breeder-tester;

Phytosanitary, agro-phytopathologist, and entomologist.

The main goal of the educational program is to satisfy the needs of society in qualified personnel by preparing specialists in the field of agriculture and bioresources, who are capable of assessing the ecological state of agroecosystems under modern conditions and reducing the impact of growing technogenic load on agricultural territories and the agro-industrial complex.

Graduate's area of professional activity

The area of professional activity of graduates who have mastered the bachelor's program includes:

- Soil, agrochemical, agroecological research and developments aimed at the rational use and preservation of agro-landscapes in the production of agricultural products;
- Control over the state of the environment and compliance with ecological regulations of production and land use;
- Agroecological assessment of agricultural lands and justification of methods for their rational use;
- Development of environmentally safe production technologies for crop production and reproduction of soil fertility; agroecological models, soil-ecological regulation.




The objects of a graduate's professional activity are:

- Agrolandscapes and agroecosystems;
- Soils, soil regimes, and processes of their functioning;
- Agricultural lands;
- Agricultural crops;
- Fertilizers and amendments;
- Technologies for the production of agricultural products and the reproduction of soil fertility;
- Field, vegetable, fruit, berry, decorative, etc. crops and their varieties (hybrids);
- Agrobiotechnological processes;
- Genetic collections of plants and the selection process;
- Soil and the reproduction of its fertility;
- Pests and means of protecting plants from them;
- Modern technologies for the production of crop products;
- Agroecological models.

Types of a graduate's professional activity are

The main type of professional activity is production and technological;

Additional types of professional activity are organizational and managerial, scientific and research.

The tasks of the graduate's professional activity:

Production and technological activities:

- Carrying out soil, agrochemical, and agroecological surveys of lands; organizing and conducting analysis of soil and plant samples;
- Compilation of soil, agroecological, and agrochemical maps and cartograms;
- Agroecological assessment of plants, soils, fertilizers, plant protection products, and ameliorants;
- Grouping lands by their suitability for agricultural crops and optimizing the anti-erosion organization of the territory of agricultural land use;
- Development of fertilizer systems and technological projects for soil fertility reproduction considering the ecological safety of agrolandscape and measures to protect soils from erosion and deflation;
- Conducting chemical, water reclamation, and agroforestry improvement of lands;
- Implementing environmentally safe cultivation technologies of agricultural crops and controlling the quality of products;
- Conducting plant and soil diagnostics, taking measures for agroecological optimization of mineral plant nutrition;
- Conducting ecological examination of agricultural land use objects;
- Soil ecological standardization;

Organizational and managerial activities:

- Organization of work of production units, agrochemical service centers (participation in the preparation of operational and long-term plans, schedules, instructions, estimates, applications for consumables, devices, equipment), preparation of reports according to approved forms and methods;
- Organization of work of performers in field and laboratory conditions;
- Conducting market research in the agrochemicals and agricultural products market;
- Making managerial decisions when producing crop products in various economic and weather conditions of farming;

Research activities:

- Analysis of soil, agrochemical, and ecological condition of agrolandscapes;
- Justification of ways to preserve and improve soil fertility and anti-erosion stability of lands;
- Participation in soil, agrochemical, and agroecological studies;
- Generalization and statistical processing of experiment results, formulation of conclusions;
- Development of techniques and ways of soil fertility reproduction.

Planned Learning Outcomes

Upon completion of the bachelor's program, the graduate should have developed general cultural, general professional, and professional competences.

A graduate who has mastered the bachelor's program should possess the following **general cultural competencies**:

The ability to use the basics of philosophical knowledge to form a worldview;

The ability to analyze the main stages and patterns of historical development of society for forming a civic stance;

The ability to use the basics of economic knowledge in various areas of life;

The ability to use the basics of legal knowledge in various areas of life;

The ability to communicate in oral and written forms in Russian, Kazakh, and foreign languages to solve problems of interpersonal and intercultural interaction;

The ability to work in a team, to tolerate social, ethnic, confessional, and cultural differences;

The ability for self-organization and self-education;

The ability to use methods and means of physical culture to ensure full-fledged social and professional activity;

The ability to use the techniques of first aid, methods of protection in emergency situations.

A graduate who has mastered the bachelor's program should possess the following **general professional competences**:

The ability to solve standard tasks of professional activity based on information and bibliographic culture using information and communication technologies and taking into account the main requirements of information security;

The ability to use the basic laws of natural science disciplines in professional activities, apply the methods of mathematical analysis;

The ability to conduct landscape analysis of territories;

The ability to recognize the main types of soils, assess their fertility level, justify the directions of soil use in agriculture;

Readiness to carry out physical, physicochemical, chemical, and microbiological analysis of soils, plants, fertilizers, and ameliorants.

A graduate who has completed the bachelor's program should possess the following **professional competences**:

Readiness to participate in conducting soil, agrochemical, and agro-ecological surveys of land;

Ability to compile soil, agro-ecological and agrochemical maps and cartograms;

Ability to optimize the water regime of plants on improved lands;

Ability to conduct an assessment and grouping of lands according to their suitability for agricultural crops;

Ability to justify the rational application of technological methods for reproducing soil fertility;

Readiness to compile crop rotation schemes, soil processing and plant protection systems, justify environmentally safe crop cultivation technologies;

Ability to perform analysis and evaluation of the quality of agricultural products;

Ability to conduct plant and soil diagnostics, take measures to optimize the mineral nutrition of plants;

Ability to conduct an environmental audit of agricultural objects;

Ability to organize the work of performers, find and make management decisions in the field of work organization and standardization in different economic and operating conditions;

Ability to determine the economic efficiency of the application of fertilizers, chemical means of reclamation, and technological methods of cultivating agricultural crops;

Ability to conduct marketing research in the markets of agrochemicals and agricultural products;

Readiness for cooperation with colleagues and working in a team of various organizational forms of ownership;

Ability to conduct soil, agrochemical, and agro-ecological research;

Ability to summarize and statistically process the results of experiments, formulation of conclusions.

Bases for undergoing professional internships

The targeted training of highly qualified specialists to meet the needs of organizations and enterprises in the agro-industrial complex is facilitated by students undergoing relevant internships.

Each type of practice for the student reinforces and deepens theoretical knowledge, forms practical skills and abilities in scientific research activities in the field of efficient production of environmentally safe crop products; it helps to gain experience in independent professional activity.

In the educational program "Agroecology", the following types of practices are provided:

- Educational (introductory) practice;
- Educational (technological) practice;
- Industrial (technological practice);
- Industrial (research) practice.

Students in this educational program can undergo internships at various agricultural enterprises and organizations, on agricultural lands of different forms of ownership, national nature parks, departments of natural resources and regulation of nature use, regional territorial inspections, and other state institutions. The bases for internships are such leading enterprises and organizations of the agro-industrial complex as "Olzha Agro" LLC, "Zamandas" farm, "Asia Altyn-2000" LLC, "Agricultural Experimental Station "Zarechnoe" LLC, "Republican Scientific-Methodological Center of Agrochemical Service of the Ministry of Agriculture of the Republic of Kazakhstan" RSI, "Kazakh Research Institute of Plant Quarantine and Protection named after Zhazken Zhiyembayev" LLC, Saimasai EEF, "Aidarbaev" farm, "Agrofirm TZhN and K" LLC, "Kazakh Research Institute of Soil Science and Agrochemistry named after U.U.Uspanov" LLC, "Kazakh Research Institute of Agriculture and Crop Production" LLC, etc.

Laboratory Base

The laboratory base allows the full implementation of educational plans, ensuring the formation of practical skills. The department operates educational laboratories:

- crop production and landscape design;
- agriculture and land management;
- intensive technologies in crop production;
- physiology and biotechnology of agricultural plants;
- agrophysics and agrosoil science.

All laboratories are equipped with the necessary laboratory equipment, which allows conducting laboratory and practical classes, research work at a high level.




Scientific and Innovative Activity

Research work is carried out in the field of plant productivity management and rational use of agrolandscapes. Scientific research at the department is carried out within the framework of initiative search topics.

Faculty and students participate in scientific conferences, symposiums, congresses, including those of an international level, publish monographs and other scientific works, complete and successfully defend doctoral and candidate dissertations.

The results of the research work of staff and students are implemented in practice and the educational process.

Participation in scientific conferences, publication of scientific articles under the supervision of the department's professors allows students to develop new competencies and earn additional points for participation in competitions for increased scholarships.