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СӘТБАЕВ
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Institute of Architecture and Civil Engineering named after T.K. Bassenov.
Department of «Engineering Systems and Networks»

GRADUATE MODEL (Master's degree)

in the educational program

7M11201 - Occupational health and safety at work

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Introduction

The main concept of the educational program is to implement a continuous process of training scientific, pedagogical and professional personnel of a new generation capable of working aimed at transforming new scientific potential in the field of occupational health and safety. The peculiarity of the EP "Occupational health and safety at work" is determined by the competencies possessed by a master who has been educated under this program.

Planning of the content of education, the way of organizing and conducting the educational process is carried out by the university and the scientific organization independently on the basis of credit technology of training.

The master's degree in scientific and pedagogical direction implements educational programs of postgraduate education for the training of scientific and scientific-pedagogical personnel for universities and scientific organizations with in-depth scientific-pedagogical and research training.

The content of the master's educational program consists of:

- theoretical training, including the study of cycles of basic and core disciplines;
- practical training of undergraduates: various types of practices, scientific or professional internships;
- research work, including the implementation of a master's thesis;
- final certification.

The content of the EP "Occupational health and safety at work" on the basis of the development of a multi-level training system, the fundamental nature and quality of training, continuity and continuity of education and science, unity of training, education, research and innovation activities aimed at maximum satisfaction of consumer needs should ensure:

- training of professional and competitive specialists in the field of occupational safety at work;
- the ability to apply knowledge of mathematics, fundamental and technical sciences;
- using methods of analysis and evaluation of experimental results.

The specialist model provides for: competencies due to the development of modern science and technology; competencies dictated by the requirements of the profession, specialty; competencies due to the socio-political system of the country, its spiritual and moral system.

To acquire a set of professional, intercultural, communicative competencies, a graduate must master the knowledge of a set of general education (OOD), basic (DB) and profile (PD) disciplines, both their mandatory component and the component of choice in accordance with the chosen trajectory of education in full, established by the state standard.

Of great importance in the modern world is the ability to carry out complex engineering and technical developments in the field of life safety; predict, identify areas of increased technogenic risk and areas of increased pollution of the working environment; optimize methods and methods to ensure

human safety from the effects of various negative factors in the technosphere;
conduct an economic assessment of the effectiveness of implemented
engineering and technical measures.

1. Goals and objectives of the educational program 7M11201 - Occupational health and safety at work

Purpose: train highly qualified masters of technical sciences with fundamental scientific knowledge in the field of occupational health and safety, industrial safety, emergency protection, capable of implementing the acquired knowledge in design, engineering, production and technological, research, organizational and managerial and scientific and pedagogical activities.

Tasks:

- selection and calculation of the main parameters of human and environmental protection means in relation to specific conditions based on known methods and systems;
- calculation and design work to create means of ensuring safety, saving and protecting a person from technogenic and anthropogenic impacts;
- development of sections of projects related to security issues;
- engineering and design and author's support of scientific research in the field of safety and technical implementation of innovative developments;
- optimization of production technologies in order to reduce the impact of negative factors on humans and the environment;
- conducting an economic assessment of the developed protection systems or proposed technical solutions;
- preparation of terms of reference for the development of design solutions in the field of hygiene and labor protection, protection in emergency situations;
- carrying out calculations for projects, a feasibility study of planned solutions;
- development of methodological and regulatory documents, technical documentation;
- examination of projects and the state of facilities for labor safety and protection in emergency situations;
- selection of life safety systems, fire, chemical, biological and other production safety;
- designing processes for ensuring hygiene and labor protection, protection in emergency situations;
- formation of the principles of labor protection culture in the organization, development of a system for collecting, analyzing information and exchanging information. Collection of information about human, technical, organizational and environmental factors that determine the safety of the system as a whole;
- development of a planned system of internal standards, operating procedures, instructions and rules;
- carrying out measurements and surveys in the field of safety, planning experiments, processing, analysis and generalization of their results, mathematical and computer modeling, making forecasts;
- compiling descriptions of ongoing research, formulating goals and objectives, preparing data and compiling reports, reviews and scientific

publications aimed at improving safety, creating new methods and systems for protecting humans and the environment, determining the plan, the main stages of research;

- choice of research method, development of a new research method;
- creation of a mathematical model of the object, the research process;
- participation in the development and implementation of methods and programs in the field of hygiene and labor protection, protection in emergency situations;
- planning, implementation of the experiment, processing of the obtained data, formulation of conclusions based on the results obtained, development of recommendations for the practical application of the results of scientific research;
- analysis and generalization of research results, publication of results in the form of scientific articles and abstracts of reports, registration of pre-patents and patents for inventions;
- development of innovative projects in the field of security, their implementation and implementation;
- setting goals and formulating tasks for the protection of the environment at the level of the enterprise, territorial production complexes and regions, as well as the activities of enterprises and regions in emergency conditions.

2. List of qualifications and positions

A graduate in the specialty 7M11201 - "Occupational health and safety at work" is awarded the academic degree of master of technical sciences.

Qualifications and positions are determined in accordance with the National qualifications Framework approved by the Protocol of march 16, 2016 by the Republican tripartite commission on social partnership and regulation of social and labor relations. approved professional standards (<https://atameken.kz/ru/services/16-professionalnyye-standarty-i-tsentry-sertifikatsii-nsk>).

Graduates of the specialty 7M11201 - "Occupational health and safety at work", regardless of the training trajectory, can work in the following positions:

- occupational safety specialist at work;
- labor protection inspector;
- fire Safety Inspector;
- specialist in the organizations of the Ministry of Emergency Situations;
- fighter of the emergency squad;
- expert on projects and conditions of facilities for life safety and environmental protection;
- specialist in research and design and survey bureaus and institutes.
- university teacher;
- a researcher.

The scope of the master's professional activity includes all sectors of the economy, including the military-industrial complex, industry, agriculture and utilities, production and consumption, government agencies in the field of life safety, protection in emergency situations, research institutes, design and survey bureaus, firms and higher educational institutions.

The objects of the master's professional activity are:

- production facilities and organizations involved in the operation of technological systems, networks and protection in emergency situations;
- production facilities and organizations involved in the development, implementation and operation of technological systems, networks and protection in emergency situations;
- factors determining the safety of life, allowing to prevent fire, radiation, chemical and other hazards.

3. Descriptors

The requirements for the master's degree level are determined on the basis of the Dublin descriptors of the second level of higher education (master's degree) and reflect the acquired competencies expressed in the achieved learning outcomes.

Learning outcomes are formulated both at the level of the entire master's degree program, and at the level of individual modules or academic discipline.

Descriptors reflect the learning outcomes that characterize the student's abilities:

- demonstrate developing knowledge and understanding in the field of occupational health and safety, based on advanced knowledge of this field, when developing and applying ideas in the context of research;
- apply their knowledge, understanding and abilities at a professional level to solve problems in a new environment, in a broader interdisciplinary context;
- to collect and interpret information for the formation of judgments, taking into account social, ethical and scientific considerations;
- clearly and unambiguously communicate information, ideas, conclusions, problems and their solutions;
- learning skills necessary for independent continuation of further education in the field of occupational health and safety at work.

4. Competencies upon completion of training

4.1 Requirements for the key competencies of graduates of the scientific and pedagogical master's degree:

To have

- about the role of science and education in public life; about current trends in the development of scientific knowledge;
- about actual methodological and philosophical problems of natural (social, humanitarian, economic) sciences;
- about the professional competence of a high school teacher;
- about contradictions and socio-economic consequences of globalization processes;

Know

- the methodology of scientific knowledge;
- principles and structure of the organization of scientific activity;
- psychology of cognitive activity of students in the learning process;
- psychological methods and means of improving the effectiveness and quality of training.

Be able to:

- use the acquired knowledge for the original development and application of ideas in the context of scientific research;
- critically analyze existing concepts, theories and approaches to the analysis of processes and phenomena;
- integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions;
- by integrating knowledge to make judgments and make decisions based on incomplete or limited information;
- apply the knowledge of pedagogy and psychology of higher education in their teaching activities;
- apply interactive teaching methods;
- to carry out information-analytical and information bibliographic work with the involvement of modern information technologies;
- think creatively and creatively approach the solution of new problems and situations;
- be fluent in a foreign language at a professional level, which allows conducting scientific research and teaching special disciplines in universities;
- summarize the results of research and analytical work in the form of a dissertation, a scientific article, a report, an analytical note, etc.;

Skills of:

- research activities, solving standard scientific problems;
- implementation of educational and pedagogical activities on credit technology of training;
- methods of teaching professional disciplines;
- the use of modern information technologies in the educational process;

- professional communication and intercultural communication;
- oratory, correct and logical formalization of their thoughts in oral and written form;
- expanding and deepening the knowledge necessary for daily professional activities and continuing education in doctoral studies.

Be competent:

- in the field of research methodology;
- in the field of scientific and scientific-pedagogical activity in higher educational institutions;
- in matters of modern educational technologies;
- in the implementation of scientific projects and research in the professional field;
- in ways to ensure constant updating of knowledge, expansion of professional skills and abilities.

Basic knowledge, skills and abilities

- to know modern directions of planning and management of scientific and innovative activities in the field of industrial and environmental safety, the ability to set and solve research and problem solving tasks;

- diagnose problems of life safety and environmental protection, develop practical recommendations on life safety and environmental protection, and ensure safety and sustainable development by methods of assessment and modeling, forecasting the development of various processes occurring in natural and man-made systems;

- to determine the probabilities (frequencies) of the implementation of dangerous situations by methods of hazard analysis and risk assessment in the occupational safety management system;

- to develop skills in the development of methodological and regulatory materials, technical documentation, risk management and modeling of occupational safety management systems at work, organization of compliance with established requirements, applicable norms, rules and standards;

- to develop the necessary skills in the field of theoretical and practical use of information technologies in the field of security, regulatory and legal bases of information technologies in the field of environmental, industrial, industrial safety and security in emergency situations.

Professional competencies

- the ability to independently acquire, comprehend, structure and use new knowledge and skills in professional activities, develop their innovative abilities;

- the ability to independently formulate research goals, establish a sequence of solving professional tasks;

- the ability to put into practice knowledge of fundamental and applied sections of disciplines that determine the focus (profile) of the Master's degree program;

- the ability to professionally select and creatively use modern scientific and technical equipment to solve scientific and practical problems;

- the ability to critically analyze, present, defend, discuss and disseminate the results of their professional activities;
- proficiency in the preparation and execution of scientific and technical documentation, scientific reports, reviews, reports and articles;
- willingness to lead a team in the field of their professional activities, tolerantly perceiving social, ethnic, confessional and cultural differences;
- willingness to communicate orally and in writing in a foreign language to solve the tasks of professional activity.

Universal, social and ethical competencies

- ability to abstract thinking, analysis, synthesis;
- the ability to use the basics of philosophical knowledge to form a worldview position;
- the ability to analyze the main stages and patterns of the historical development of society for the formation of a civic position;
- the ability to use the basics of economic knowledge in various spheres of life;
- ability to use the basics of legal knowledge in various spheres of life;
- willingness to act in non-standard situations, to bear social and ethical responsibility for the decisions taken;
- readiness for self-development, self-realization, use of creative potential;
- the ability to use methods and means of physical culture to ensure full-fledged social and professional activities;
- the ability to use first aid techniques, methods of protection in emergency situations.

Special and managerial competencies:

- analyze and assess the degree of danger of anthropogenic impact on humans and the environment according to various criteria, including environmental risks; predict the occurrence and development of negative impacts and assess their consequences;
- simulate dangerous processes in the technosphere and ensure the safety of the systems being created;
- use modern software products in the field of modeling, forecasting, risk assessment and prevention, risk management;
- design and calculate safety systems and devices, means of improving the safety of facilities; evaluate the effectiveness of their work based on an analysis of living conditions;
- identify the main hazards to the environment by legislative and legal acts and conceptual and terminological apparatus in the field of life safety and environmental protection;
- carry out engineering and economic calculations of measures to ensure technosphere safety, read project documentation and competently draw up a task for designing events;
- to lead a team in the field of their professional activity, to perceive social, ethnic, confessional and cultural differences with tolerance.

4.2 Requirements for the research work of a master's student in the scientific and pedagogical magistracy

- the ability to solve professional problems by integrating fundamental and technical sciences and specialized knowledge in the field of hygiene and labor protection, industrial safety, protection in emergency situations, obtained during the development of the master's program;
- the ability to independently conduct scientific research in the professional field, summarize and analyze experimental information, draw conclusions, formulate conclusions and recommendations;
- the ability to create and explore models of the objects under study based on the use of in-depth theoretical and practical knowledge in the field of life safety;
- the ability to analyze, optimize and apply modern information technologies in solving scientific problems.

4.3 Requirements for the organization of practices

The educational program of the scientific and pedagogical Master's degree includes two types of practices that are conducted in parallel with theoretical training or in a separate period:

- pedagogical in the DB cycle - at the university;
- research in the PD cycle - at the place of completion of the dissertation.

Pedagogical practice is conducted in order to form practical skills of teaching and learning methods. At the same time, undergraduates are involved in conducting undergraduate classes at the discretion of the university.

The research practice of the undergraduate is conducted in order to familiarize himself with the latest theoretical, methodological and technological achievements of domestic and foreign science, modern methods of scientific research, processing and interpretation of experimental data.

5. Requirements for completing studies and obtaining a diploma

The main criterion for the completion of the educational process for the preparation of masters of technical sciences is the development of at least 120 credits by a master's student, of which at least 84 credits of theoretical training, at least 12 credits of pedagogical and research practice and at least 24 credits of research work of a master's student.

Degree awarded: The graduate of this educational program is awarded the academic degree «master of technical sciences» in the direction 7M11201 – «Occupational health and safety at work».

A graduate who has mastered master's degree programs should have the following general professional competencies:

- the ability to independently acquire, comprehend, structure and use new knowledge and skills in professional activities, develop their innovative abilities;
- the ability to independently formulate research goals, establish a sequence for solving professional problems;
- the ability to put into practice the knowledge of fundamental and applied sections of the disciplines that determine the direction (profile) of the master's program;
- the ability to professionally choose and creatively use modern scientific and technical equipment to solve scientific and practical problems;
- the ability to critically analyze, present, defend, discuss and disseminate the results of their professional activities;
- possession of skills in the preparation and execution of scientific and technical documentation, scientific reports, reviews, reports and articles;
- willingness to lead a team in the field of their professional activity, tolerantly perceiving social, ethnic, confessional and cultural differences;
- readiness for communication in oral and written forms in a foreign language to solve the problems of professional activity.

A graduate who has mastered the master's program must have professional competencies corresponding to the types of professional activities that the master's program is focused on.

Design activity:

- the ability to perform complex engineering and technical developments in the field of safety;
- the ability to predict, determine areas of increased technogenic risk and areas of increased pollution;
- the ability to optimize the methods and means of ensuring human security from the impact of various negative factors in the technosphere;
- the ability to conduct an economic assessment of the effectiveness of the implemented engineering and technical measures. Production and technological activities:
- the ability to independently carry out production and research and production work in solving practical problems;

- the ability to professionally operate modern equipment and instruments in the field of the mastered master's program;
- the ability to use modern methods of processing and interpreting complex information to solve production problems;
- the ability to independently draw up and submit projects for research and development work;
- readiness to design complex research and scientific and production works in solving professional problems;
- the ability to independently conduct audits and inspections;
- the ability to assess production risks and draw up plans for corrective actions, to have the skills of HAZOP, HAZID methods;
- the ability to conduct incident investigations according to the "five whys" and "tree of reasons" methods.

Organizational and managerial activities:

- readiness to use the practical skills of organizing and managing research and development work in solving professional problems of protecting the environment at the level of the enterprise, territorial production complexes and regions, as well as the activities of the enterprise in an emergency mode;
- readiness for the practical use of regulatory documents in the planning and organization of scientific and production work on safety issues;
- the ability to interact with government services in the field of industrial, fire safety, protection in emergency situations;
- the ability to rationally address issues of safe placement and use of technical means in the regions;
- the ability to apply in practice the theory of managerial decision-making and methods of expert assessments.

Scientific and pedagogical activity:

- the ability to conduct seminars, laboratory and practical classes;
- the ability to participate in the development of interactive teaching methods, educational and methodological documentation, multimedia materials and methods for monitoring learning;
- the ability to participate in the management of the scientific and educational work of students in the field of life safety.

When developing a master's program, all general cultural and general professional competencies, as well as professional competencies related to those types of professional activities that the master's program is focused on, are included in the set of required results for mastering the master's program.

Head of the department
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Change registration sheet _____

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