NCJS «KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY
named after K.I.SATBAYEV»

Institute of Architecture and Construction named after T.Basenov
Department of Engineering Systems and Nets

EDUCATIONAL PROGRAM
6B11201 Occupational health and safety at work

Code and classification of the field of education: **6B11 Services**
Code and classification of training directions: **6B112 Occupational health and safety at work**
Group of educational programs: **B094 Sanitary and preventive measures**
Level based on NQF: **6**
Level based on IQF: **6**
Study period: **4**
Amount of credits: **240**

Almaty 2023

Educational program 6B11201 Occupational health and safety at work was approved at the meeting of K.I. Satbayev KazNRTU Academic Council

Minutes # 5 dated «24» November 2022.

was reviewed and recommended for approval at the meeting of K.I. Satbayev KazNRTU Educational and Methodological Council

Minutes # 36 dated «17» November 2022.

Educational program 6B11201 Occupational health and safety at work was developed by Academic committee based on direction «Labor safety»

Full name	**Academic degree/ academic title**	**Position**	**Workplace**	**Signature**
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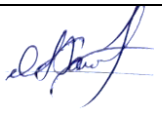
Baimukhan A.K.		Understudent, 2 course	LPP “EcoExpert”	

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List of abbreviations and designations

NAO KazNRTU named after K.I.Satpayev - NAO "Kazakh National Research Technical University named after K.I.Satpayev";

SOSE - State obligatory standard of education of the Republic of Kazakhstan;

EP - educational program;

IWS - independent work of a student (student, undergraduate, doctoral student);

IWSP - independent work of a student with a teacher (independent work of a student (undergraduate, doctoral student) with a teacher);

WC - working curriculum;

QED - catalog of elective disciplines;

VK - university component;

KV - component of choice;

NQF - National Qualifications Framework;

SQF - Sectoral Qualifications Framework;

RO - learning outcomes.

1. Description of educational program

The mission of the educational program 6B11201 - Occupational Health and Safety at Work is to provide training for first-level specialists capable of implementing new technologies, designing, experimental work, operating equipment, participating in solving problems of large-scale transition, management, optimization and modernization of industrial production and processes, materials and devices that determine the innovative development of scientific and technological progress and the improvement of the living standards of society.

In accordance with this mission, the main objectives of this OP are:

- the formation of the graduate's knowledge, skills and abilities necessary to solve the problems of professional activity, ensuring control over the level of development of competencies, giving him the opportunity to choose the area of ??professional activity and improve personal and professional qualities;

- socio-humanitarian and professional training of bachelors in the field of hygiene and labor protection in accordance with the development of science and production of various industries, as well as with the needs of national research centers, master's and doctoral studies of higher educational institutions;

- providing knowledge, skills and abilities that allow you to navigate in various situations in solving issues in the field of hygiene and labor protection, the ability to solve engineering problems for the development of labor protection measures for various sectors of the industrial sector of the economy of the Republic of Kazakhstan, to conduct research work in the field of hygiene and labor protection;

- development of creative abilities, initiative and innovation in order to move to the second stage of higher education - master's degree;

- training of highly qualified personnel with a high level of social, scientific and industrial culture, capable of formulating and solving modern scientific-fundamental and scientific-practical tasks of the regional, national and world level in the field of

occupational health and safety.

2. Purpose and objectives of educational program

Purpose of EP: Training of highly qualified specialists with a high level of social, scientific and industrial safety culture, able to formulate and solve modern problems in the field of hygiene and labor protection in production.

Tasks of EP: - Studying the cycle of general education disciplines to provide social and humanitarian education based on the laws of socio-economic development of society, history, modern information technologies, the state language, foreign and Russian languages;

- The study of the cycle of basic disciplines to provide knowledge of natural sciences, general technical and economic disciplines, as the foundation of vocational education;
- The study of a cycle of major disciplines for the formation of theoretical knowledge, practical skills and abilities in the field of hygiene and labor protection in production.
- The study of disciplines that form knowledge, skills and abilities of planning and organizing research, designing systems for monitoring hygiene and labor protection in production, including using modern computer technologies and programs.
- Familiarization with potentially dangerous processes and equipment of industrial facilities during the period of production practices.
- Acquisition of skills and abilities of modern control in the field of hygiene and labor protection at work.
- Acquisition of skills to assess working conditions at production facilities for the preparation of regulatory documentation and all types of reporting on their certification.

3. Requirements for evaluating the educational program learning outcomes

Description of mandatory standard requirements for graduating from a university and conferring an academic degree of a bachelor: mastering at least 240 academic credits of theoretical training and a final thesis or a state exam in a specialty.

Full-time form of education

Terms of study: from 4 to 7 years.

Teaching language: Kazakh, Russian, English (more than 50%)

A - knowledge and understanding:

A1 - knowledge and understanding of the classical results of mathematics, physics, chemistry, biology and computer science underlying the concepts, theories and principles of chemical and biochemical engineering, to the extent necessary for mastering the educational program;

A2 - knowledge and understanding of the basic concepts, theories and principles of chemical and biochemical engineering;

A3 - knowledge and understanding of the main economic, social, environmental, ethical criteria, as well as an understanding of safety and sustainability priorities that affect engineering decisions;

A4 - knowledge of the possibilities of computer technology in the engineering field and the skills to use Internet communications, databases and basic software products designed to support engineering and scientific activities in the field of life safety and environmental protection;

A5 - knowledge and understanding of the essence of natural and man-made processes that cause violation of the requirements of technosphere safety and protection in emergency situations;

A6 - knowledge and understanding of the multifunctional activities of man and mankind, based on modern approaches to the requirements of industrial safety and safety in the environment;

A7 - knowledge of the principles of standardization, certification and measurement techniques in the field of technosphere safety and safety in the environment;

A8 - knowledge and understanding of the main provisions of the Constitution of the Republic of Kazakhstan, the Labor Code, legislative and regulatory and technical acts in the field of industrial, labor protection, protection in emergency situations.

C – application of knowledge and understanding

B1 - independent development and promotion of various options for solving professional problems using theoretical and practical knowledge;

B2 - the ability to apply classical scientific knowledge and traditional engineering approaches to the analysis of professional problems;

B3 - application of practical skills of laboratory and analytical work to solve professional problems of occupational health and safety;

B4 - use of written and oral communication in a foreign language;

B5 - application of theoretical knowledge and practical skills in solving typical professional problems under standard conditions; monitoring of technological equipment to ensure the safety of industrial production;

B6 - application of knowledge and understanding in the development of legal, organizational, technical and economic measures to improve working conditions;

B7 - knowledge of the methodology for assessing the state of workplaces by managing the work of attesting production facilities for working conditions and declaring the safety of potentially hazardous facilities.

C - formation of judgments

C1 - the ability to formulate the goal of the task, the choice of means and methods for achieving it;

C2 - the ability to form critical judgments, demonstrate flexibility and critical thinking;

C3 - the ability to find and accept adequate ways to solve professional problems;

C4 - formation of judgments about the types and tasks of professional activity in life safety.

D - personal abilities

D1 - the ability to work in a team based on interaction, understanding, awareness of priorities and organization of team activity;

D2 - the ability to interact and technical cooperation with specialists from related fields of engineering;

D3 - the ability to manifest interpersonal understanding, readiness for a reasonable resolution of conflicts, the desire to achieve a mutually beneficial result in negotiations;

D4 - the ability to comply with and maintain ethical norms and rules, understand the attitudes of tolerant behavior, prevent domestic racism, xenophobia, extremism and counter them;

D5 - the ability for systemic thinking, creativity, innovation;

D6 - the ability to convince, to show critical constructive thinking, willingness to apply new methods and approaches in difficult situations of professional activity.

B - Basic knowledge, skills and abilities

B1 - the use of the basic laws of natural sciences (chemistry, physics, biology) and the application of methods of mathematical analysis and modeling in solving problems in the field of life safety, the ability to find solutions to general technical problems;

B2 - the ability to use modern information technologies, to process information using application programs and databases to calculate hazardous and harmful production factors, their monitoring and control;

B3 - possession of communication skills in the state, Russian and foreign languages;

B4 - knowledge of the main scientific and technical problems and development prospects in the field of life safety, their relationship with related industries;

B5 - the ability to carry out a technical, economic and environmental analysis of engineering solutions;

B6 - skills in carrying out technological measures to mitigate the consequences of natural and man-made emergencies, eliminate their consequences;

B7 - skills to identify harmful and hazardous production factors and ways to protect workers from them, to predict phenomena that are harmful to human health;

B8 - the ability to plan organizational and technical measures to deal with emergencies in the oil and gas, mining and metallurgical and other mining and processing industries, develop measures to eliminate the consequences of accidents of the main methods and methods for developing environmental measures.

P - Professional competencies, including those in accordance with the requirements of industry professional standards (if any)

P1 - a wide range of theoretical and practical knowledge in the field of life safety;

P2 - the ability to monitor production parameters and environmental expertise, formulate economically sound measures to improve working conditions, calculate damage from accidents, occupational diseases, industrial accidents and emergencies;

P3 - the ability to participate in the improvement of quality management systems, labor protection and industrial safety management in the organization to

minimize the impact of hazards and hazards on humans;

P4 - the ability to control the rules of the basics of labor protection, industrial sanitation and occupational health, industrial safety and sustainability of economic facilities in emergency situations, as well as radiation, chemical, biological, fire safety;

P5 - the ability to apply knowledge of modern trends in the development of the industry in production and technological, design, research and organizational and management activities;

P6 - the ability to apply the acquired knowledge to address issues of safety and reliability of operation of machinery and equipment, to assess the risk of using machinery and process equipment in terms of exposure to emergency situations;

P7 - the ability to carry out production monitoring of the state of working conditions using innovative methods and means of control, independently draw up record keeping in the field of life safety, fill out reporting forms.

O - Universal, social and ethical competencies

O1 - the desire for self-development, improving one's qualifications and skills;

O2 - the ability to analyze socially significant problems and processes;

O3 - the ability to perceive a variety of cultural traditions and customs, the ability to tolerate views;

O4 - knowledge of social and ethical values based on public opinion, traditions, customs, social norms and the ability to focus on them in their professional activities;

O5 - knowledge of trends in the social development of society, the ability to adequately navigate in various social situations;

O6 - understanding and practical use of healthy lifestyle norms, including prevention issues;

O7 - knowledge of the state, Russian and one of the foreign languages at a level that ensures human communication;

O8 - the ability to independently acquire with the help of information technology and use in practice new knowledge and skills, including in new areas of knowledge that are not directly related to the field of activity.

C - Special and managerial competencies

C1 - possession of a culture of thinking, the ability to generalize, analyze, perceive information, set a goal and choose ways to achieve it;

C2 - the ability to find and make managerial decisions in the field of labor organization and the implementation of labor protection measures; control the execution of tasks;

C3 - the ability to create in the team the psychology of safe thinking and a healthy moral and psychological climate, to maintain the ability of physical and spiritual self-improvement, professional growth, using knowledge of the issues of physiology and psychology of work, social protection of workers;

C4 - possession of the basics of project management and decision-making methods used in the development of measures in the field of life safety;

C5 - knowledge of the principles of management, control and correction of activities in the context of teamwork, improving managerial and performance professionalism;

C6 - ensuring technological discipline, sanitary and hygienic mode of operation of the enterprise, maintenance of technological equipment in proper condition, organization of compliance with safety regulations at work and environmental protection rules.

4. Passport of educational program

4.1. General information

№	Field name	Comments
1	Code and classification of the field of education	6B11 Services
2	Code and classification of training directions	6B112 Occupational health and safety
3	Educational program group	B094 Sanitary and preventive measures
4	Educational program name	6B11201 Occupational health and safety at work
5	Short description of educational program	Fundamental training in the organization of the industrial safety and labor protection service of industrial enterprises, organizations and institutions; civil defense services of industrial enterprises, institutions and organizations; assessing the working conditions of employees of production facilities; determination of the level of potential danger of industrial enterprises, technological processes and equipment for the development of a safety declaration; monitoring the state of industrial safety and labor protection and the environment at industrial enterprises and the sustainability of economic facilities in emergency situations.
6	Purpose of EP	Training of highly qualified specialists with a high level of social, scientific and industrial safety culture, able to formulate and solve modern problems in the field of hygiene and labor protection in production
7	Type of EP	New EP
8	The level based on NQF	6
9	The level based on IQF	6
10	Distinctive features of EP	-
11	List of competencies of educational program	RO1 - Possess basic knowledge

		in the field of natural sciences (social, humanitarian, economic) disciplines that contribute to the formation of a highly educated personality with a broad outlook and culture of thinking, who speaks foreign languages. RO2 - Possession of methods and means of physical and mathematical (computer) modeling, including the use of universal and specialized software and computer systems, computer-aided design systems, standard research automation packages, possession of test methods PO3 - Have knowledge of the regulatory framework in the field of occupational health and safety, the principles of organizing labor protection, safety in emergency situations and environmental protection at economic facilities; requirements of normative and technical documentation in the field of occupational health and safety to ensure safety in general RO4 - Be able to measure the levels of hazards in production conditions, process the results in accordance with regulatory requirements; assess professional risks, taking into account the nature of harmful and dangerous factors of the production environment, the labor process based on measurement and monitoring data RO5 - Ability to develop and implement new techniques and technologies to ensure occupational health and safety using international standards and standards of the Republic of Kazakhstan and participate in the improvement of quality management systems, labor protection and industrial safety

		management in the organization to minimize the impact of hazards and hazards on humans RO6 - Plan and manage the factors of fire, industrial, energy and environmental safety, organize the safety of equipment and technological processes to protect workers from hazards of man-made and natural origin RO7 - Ensure compliance with the main technical and organizational measures to eliminate the consequences of natural and man-made emergencies in accordance with regulatory documents; use knowledge of the organizational foundations of the safety of various production processes in emergency situations PO8 - Have a culture of safety and risk-based thinking, in which safety and environmental protection are considered as the most important priorities in life and work; plan the creation in the team of the psychology of safe thinking and a healthy moral and psychological climate, maintain the ability of physical and spiritual self-improvement, professional growth, using knowledge of the issues of social protection of employees RO9 - Be able to organize training on ensuring labor safety and protection, organizing civil protection, ensuring safety from environmental and production factors and putting into practice skills in providing first aid to victims in emergency situations to reduce the loss of population and personnel of economic facilities RO10 - Carry out certification of production facilities for working conditions and carry out work to create comfortable working conditions, prevent and prevent

		accidents and occupational diseases at work using the methodology for attestation and certification RO11 - Make an inventory of emission sources, determine the amount of emissions of pollutants into the atmosphere, including greenhouse gases, draw up reporting documentation based on the results of environmental monitoring, recommend measures to reduce them
12	Learning outcomes of educational program	A graduate upon completion of EP 6B112 - Occupational Health and Safety at Work can carry out professional activities at industrial enterprises of all industries of various forms of ownership, in institutions and organizations with a staff of more than 50 people in the safety and labor protection services, industrial safety, departments of the Ministry of Emergency Situations Republic of Kazakhstan, subdivisions of the Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan.
13	Education form	full-time
14	Period of training	4
15	Amount of credits	240
16	Languages of instruction	Russian, Kazakh, English
17	Academic degree awarded	bachelor
18	Developer(s) and authors	

4.2. Relationship between the achievability of the formed learning outcomes based on educational program and academic disciplines

№	Discipline name	Short description of discipline	Amount of credits	Generated learning outcomes (codes)										
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
Cycle of general education disciplines Required component														
LNG 108	Foreign language	After determining the level (according to the results of diagnostic testing or IELTS results), students are divided into groups and disciplines. The name of the discipline corresponds to the level of English proficiency. When moving from level to level, prerequisites and postrequisites of disciplines are observed	10	v										
LNG 104	Kazakh (Russian) language	The socio-political, socio-cultural spheres of communication and functional styles of the modern Kazakh (Russian) language are considered. The course covers the specifics of the scientific style in order to develop and activate professional communication skills and abilities of students. The course allows students to practically master the basics of the scientific style and develop the ability to produce a structural and semantic analysis of the text.	10	v										
KFK	Physical Culture	The purpose of the discipline is	8	v										

101-104		to master the forms and methods of forming a healthy lifestyle within the framework of the vocational education system. Acquaintance with the natural-science foundations of physical education, possession of modern health-improving technologies, the main methods of independent physical education and sports. And also within the framework of													
CSE 677	Information and Communication Technologies (in English)	The task of studying the discipline is to acquire theoretical knowledge about information processes, new information technologies, local and global computer networks, methods of information protection; obtaining skills in the use of text editors and spreadsheet processors; creation of databases and various categories of application programs.	5		***v***										
HUM 137	History of Kazakhstan	The course studies historical events, phenomena, facts, processes that took place on the territory of Kazakhstan from ancient times to the present day. The sections of the discipline include: introduction to the history of Kazakhstan; the steppe empire of the Turks; early feudal states on the territory of Kazakhstan; Kazakhstan during the Mongol conquest (XIII	5	***v***	***v***										

		century); medieval states in the XIV-XV centuries. The main stages of the formation of Kazakh statehood are also considered: the era of the Kazakh Khanate of the XV-XVIII centuries. Kazakhstan within the Russian Empire; Kazakhstan in the period of civil confrontation and in the conditions of a totalitarian system; Kazakhstan during the Great Patriotic War; Kazakhstan in the period of formation of independence and at the present stage												
HUM 132	Philosophy	Philosophy forms and develops critical and creative thinking, worldview and culture, provides knowledge about the most general and fundamental problems of being and endows them with a methodology for solving various theoretical practical issues. Philosophy expands the horizon of vision of the modern world, forms citizenship and patriotism, contributes to the education of self-esteem, awareness of the value of human existence. It teaches to think and act correctly, develops the skills of practical and cognitive activity, helps to seek and find ways and means of life in harmony with oneself, society, and the world around.	5	**v**										

HUM 120	Module of socio-political knowledge (sociology, political science)	The purpose of the course: the formation of theoretical knowledge about society as an integral system, its structural elements, connections and relationships between them, the features of their functioning and development, as well as the political socialization of students of a technical university, ensuring the political aspect of training a highly qualified specialist based on modern world and domestic political thought . The tasks of mastering the discipline: the study of the basic values of social and political culture and the willingness to rely on them in their personal, professional and general cultural development; study and understanding of the laws of development of society and the ability to operate this knowledge in professional activities; the ability to analyze social and political problems, processes, etc.	3	**v**											
HUM 134	Module of socio-political knowledge (culturology, psychology)	It is designed to acquaint students with the cultural achievements of mankind, to understand and assimilate the basic forms and universal patterns of the formation and development of culture, to develop their desire and skills to	5	**v**											

		independently comprehend the entire wealth of values of world culture for self-improvement and professional growth. During the course of cultural studies, the student will consider the general problems of the theory of culture, leading cultural concepts, universal patterns and mechanisms for the formation and development of culture, the main historical stages of the formation and development of Kazakhstani culture, its most important achievements. In the course of studying the course, students acquire theoretical knowledge, practical skills and abilities, forming their professional orientation from the standpoint of psychological aspects												
Cycle of general education disciplines University component															
HUM 136	Fundamentals of anti-corruption culture and law	The discipline studies the essence, causes, causes of sustainable development of corruption from both historical and modern points of view. Considers the prerequisites and impacts for the development of an anti-corruption culture. Studies the development of countering corruption on the basis of social, economic, legal, cultural, moral and ethical	5	**v**											

		norms. She studies the problems of forming an anti-corruption culture based on the relationship with various types of social relations and various manifestations.												
MNG 489	Fundamentals of Economy and Entrepreneurship	The discipline studies the foundations of entrepreneurial activity and leadership from the point of view of science and law; features, problematic aspects and development prospects; theory and practice of entrepreneurship as a system of economic, organizational and legal relations of business structures; readiness of entrepreneurs for innovative susceptibility. The discipline reveals the content of entrepreneurial activity, career stages, qualities, competencies and responsibilities of an entrepreneur, theoretical and practical business planning and economic expertise of business ideas, as well as risk analysis of innovative development, introduction of new technologies and technological solutions.	5	**v**										
CIV970	Fundamentals of scientific research methods	The purpose of studying the discipline is, on the basis of theoretical and practical knowledge, to ensure the adoption of evidence-based decisions in the performance of professional tasks. In the process	5	**v**										

		of achieving the goal, tasks such as the formation of a scientific way of thinking, the acquisition of a complex of knowledge about the methodology of scientific knowledge and creativity, familiarization with the fundamental principles of planning and organizing scientific work in relevant areas.												
HYD 438	Ecology and life safety	The discipline studies theoretical and practical skills to create safe, harmless and environmentally friendly living conditions. The impact of natural and man-made hazards on the human body and their monitoring; culture of life safety; industrial sanitation; the impact of harmful substances and sources of pollution on the human body and their maximum permissible concentrations in the air of the working area; natural and man-made emergencies.	5					**v**						**v**
Cycle of basic disciplines University component														
MAT 101	Mathematics I	The course is based on the study of mathematical analysis in a volume that allows you to explore elementary functions and solve the simplest geometric, physical and other applied problems. The main attention is paid to differential and integral calculus. The sections of the	5		**v**									

		course include differential calculus of functions of one variable, derivative and differentials, study of the behavior of functions, complex numbers, polynomials. Indefinite integrals, their properties and methods of calculation. Definite integrals and their applications. Improper integrals.													
PHY 468	Physics	The course studies the basic physical phenomena and laws of classical and modern physics; methods of physical research; the influence of physics as a science on the development of technology; connection of physics with other sciences and its role in solving scientific and technical problems of the specialty. The course covers the following sections: mechanics, mechanical harmonic waves, fundamentals of molecular kinetic theory and thermodynamics, electrostatics, direct current, electromagnetism, geometric optics, wave properties of light, laws of thermal radiation, photoelectric effect.	5		**v**										
MAT 102	Mathematics II	The discipline is a continuation of Mathematics 1. The sections of the course include elements of linear algebra and analytic geometry. The main questions of linear algebra are considered:	5		**v**										

		linear and self-adjoint operators, quadratic forms, linear programming. Differential calculus of a function of several variables and its applications. Multiple integrals. The theory of determinants and matrices, linear systems of equations, as well as elements of vector algebra. Includes elements of analytical geometry in the plane and in space.												
GEN 429	Engineering and computer graphics	The course develops the following skills for students: depict all possible combinations of geometric shapes on a plane, conduct research and measure them, allowing image transformations; create technical drawings, which are the main and reliable means of information providing communication between the designer and the designer, technologist, builder, in the AutoCAD environment.	5		**v**									
HYD463	Technosphere safety management	The discipline studies the following tasks of professional activity: systems of state and industrial control over technosphere safety; methods and means of ensuring the safety of the technosphere; violation of normal operating conditions and the occurrence of emergency and emergency situations;	5							**v**		**v**		

		management of industrial and environmental safety at enterprises; measures and principles of protection of workers, population and territories from emergencies												
SAF119	Control and measurement in OS	The discipline provides theoretical and practical training of students in measurement methods, the acquisition of skills in working with devices for monitoring and measuring parameters of environmental pollution. Forms a system of knowledge, skills and abilities for students to use the means of control and measurement in life safety.	5			**v**								**v**
HYD466	Physical and chemical processes in the technosphere	The purpose of studying the discipline “Physical and chemical processes in the technosphere” is the formation of a holistic view of the processes and phenomena of the physical and chemical interaction of pollutants with environmental components. Patterns of physical phenomena and chemical processes in the environment under the influence of natural and anthropogenic factors and the impact of pollutants on the components of the atmosphere, hydrosphere and lithosphere.	4		**v**					**v**				
SAF125	Calculation of damage from disability, accidents and AIA	The discipline forms students’ theoretical and practical skills in	5		**v**			**v**						

		order to assess the damage from disability, accidents at hazardous production facilities, as well as quantify the damage from accidents occurring at hazardous production facilities												
HYD464	Labor protection at work	The discipline contributes to the formation of students' knowledge, skills and abilities on the methods and means of protecting workers in production, identifying dangerous and harmful production factors and mastering the methodology for calculating protection against them. The discipline introduces students to the legal framework for labor protection, the causes of accidents and occupational diseases at work, and the main measures to protect workers at the enterprise.	4					v				v		
HYD465	The physical basis of noise protection	The purpose of studying the discipline "Physical foundations of noise protection" is the formation of students' fundamental knowledge of engineering acoustics, which allows them to carry out independent work to protect workers from the harmful effects of noise and vibration. Brief description of the course: Physical characteristics of sound waves and sound sources. Human perception of noise.	5		v					v				

		Noise spectra. Impact of noise and vibration on the human body. Principles of noise measurement and regulation. Noise and vibration control methods. Noise sources in cities and towns. Noise control of engineering and sanitary equipment.												
SAF142	Industrial sanitation and occupational health	One of the main subjects of the educational program, which gives students knowledge of the scientific and engineering fundamentals of labor protection, forms the competencies of their qualified application in practice, providing safe and harmless working conditions, preventing industrial injuries and occupational diseases. Study of the organizational, methodological, regulatory, technical and legal basis for industrial sanitation and occupational health.	5			**v**							**v**	
SAF140	Collective and individual means of protection	The discipline forms students' knowledge and skills about individual means, teaches the use of individual and collective means of protection in practice. When studying the course, the questions of the use of personal protective equipment, their characteristics, types, collective protective equipment used at the workplace and during	5					**v**					**v**	

		emergencies, their characteristics, types are considered.												
HYD167	Fundamentals of scientific research methods	The purpose of studying the discipline is, on the basis of theoretical and practical knowledge, to ensure the adoption of evidence-based decisions in the performance of professional tasks. In the process of achieving the goal, tasks such as the formation of a scientific way of thinking, the acquisition of a complex of knowledge about the methodology of scientific knowledge and creativity, familiarization with the fundamental principles of planning and organizing scientific work in relevant areas.	5			**v**							**v**	
SAF 138	Potentially dangerous technologies	The discipline gives students knowledge on ensuring labor safety, fundamental knowledge of potentially hazardous technologies in the main industries (mining, metallurgical, machine-building, oil, chemical, etc.) and the ability to make decisions in the event of adverse factors and dangerous situations.	5					**v**					**v**	
SAF127	Declaration of safety of potentially dangerous objects	The study of the discipline provides in-depth knowledge on the development of an industrial safety declaration for a hazardous production facility. Forms the	5					**v**				**v**		

		skills of regulatory and legal support of the declaration of industrial safety of hazardous production facilities, development, examination and registration of the declaration of industrial safety of hazardous production facilities.												
SAF126	Reliability of technical systems and risk management	The discipline gives concepts about the reliability of technical systems, classification of failures, quantitative indicators of reliability, laws used in the theory of reliability. Influence of climatic factors on reliability. Reliability criteria, choice of indicators, collection of information and methods of its processing. Organization of the reliability service, experimental evaluation, theory of risk and risk management.	5		**v**						**v**			
SAF136	Emergency Medicine	The discipline deals with issues of readiness to carry out anti-epidemic measures, organizing the protection of the population in foci of especially dangerous infections, in case of deterioration of the radiation situation, natural disasters and other emergencies; readiness to provide medical assistance in emergency situations, including accidents at work.	5							**v**		**v**		

Cycle of basic disciplines Component of choice														
SAF 143	Organizational, legal and regulatory framework in the Belarusian Railways	The study of the discipline is aimed at the students' assimilation of the legislative acts of the Republic of Kazakhstan in the field of industrial safety, environmental protection, improving working conditions, maintaining health and working capacity from a legal and legislative point of view, as well as in organizing work in case of accidents, natural disasters, accidents and catastrophes. The basic concepts of international law, international standards for industrial safety, the system of labor safety standards are given.	5			**v**		**v**						
HYD197	Technogenic emergencies	Technogenic emergencies: causes, features of manifestation, classification, damaging factors and parameters. Transport accidents. Fires, explosions. Accidents with the release of chemically dangerous substances. The presence of harmful substances in the environment above the maximum permissible concentrations (MAC). Accidents with release (threat of release) of radioactive substances. Sudden destruction of buildings. Accidents on electric power systems.	5						**v**	**v**				

		Accidents on life support systems. Accidents of communication systems and telecommunications. Accidents at wastewater treatment plants. Hydrodynamic accidents.												
CIV124	Engineering systems of buildings and structures	Discipline is a must. The acquisition by future specialists of the basics of theoretical knowledge and practical skills in the field of water supply, sewerage, gas supply, heat supply of settlements.	5					v		v				
SAF120	Labor and environmental protection	The discipline provides theoretical and practical skills in the system of labor and environmental protection management at enterprises of various sectors of the economy. The issues of ensuring optimal working conditions for employees of enterprises, depending on hazardous and harmful production factors, the main sources of environmental pollution, familiarization with methods for reducing industrial injuries and pollution of the technosphere are considered.	5					v						v
HYD467	Protection against energy influences	The purpose of studying the discipline is to familiarize students with the basics of knowledge about the distribution of energy effects of electromagnetic and acoustic waves, the features of the effects	5					v		v				

		of electromagnetic radiation on humans, the assessment of the magnitude of electromagnetic and acoustic fields in the workplace, modern ideas about protection from electromagnetic and acoustic fields, preparing them for the use of the obtained knowledge in real professional activity. Protection of the environment from ionizing radiation. Protection of the environment from electromagnetic (radio frequency) pollution. Environmental protection from thermal pollution. Protection of the environment from vibroacoustic pollution.												
HYD469	Supervision and control in the field of security	The purpose of studying the discipline "Supervision and control in the field of safety" is the formation of knowledge necessary for the implementation of supervision in the field of safety by state bodies of supervision and production control over the state of safety of technological processes and industries. The objectives of mastering the discipline are: - the formation of a safety culture, which implies the readiness and ability of a graduate to use the acquired body of knowledge, skills and abilities to ensure	5			**v**		**v**						

		safety in the field of professional activity; - acquisition of knowledge, skills and abilities to identify hazards and assess risks; - formation of abilities for a reasoned justification of their decisions from the point of view of safety.												
HYD468	Chemical and biological safety	The purpose of studying the discipline "Chemical and biological safety" is to equip future specialists with the theoretical knowledge and practical skills necessary for: - creating safe and harmless living conditions; - designing new equipment and technological processes in accordance with modern requirements for the safety and security of their operation, taking into account the stability of the operation of business facilities and technical systems. Chemical and biological substances and habitat. Safety of chemical elements mandatory for the body. Toxicology of organic poisons. Danger of distribution of inorganic chemical toxic substances. Features of receipt and distribution of chemical toxic substances. Toxicological protection of the environment from solid waste. Fundamentals of antidote therapy for poisoning with biological poisons.	6				v		v					

		Toxicology of chemical warfare agents and radioactive elements. Toxicology of atmospheric air.												
HYD470	Occupational risk and its assessment	The purpose of studying the discipline is to study modern risk-oriented approaches and methods for assessing occupational risks when exposed to harmful and dangerous production factors; development of measures to manage professional risks; knowledge of legal and regulatory and methodological acts and methods for analysis and assessment in the field of assessing the professional risks of personnel; organization of work on risk assessment, the procedure for conducting risk analysis	6				**v**					**v**		
HYD198	Physiology and psychology of labor	The role of psychophysiological factors in the protection of labor activity. Physiological bases of labor. Physiology of the central nervous system. Consciousness and thinking. Job. The burden and stress of work. Fundamentals of labor physiology, fatigue and prevention. Methods and tools of labor psychology. Organizational development in the labor collective. Labor collective. Psychology of personality and collective. Workforce management. Condition and nature of work. Safety and	5					**v**			**v**			

		accident prevention. Influence of stress on the functional systems of the body and on labor activity Extreme conditions of human activity in the labor process.												
HYD483	Electrical safety	The discipline studies the requirements of electrical safety at production facilities and during the operation of technological equipment. Introduces dangerous electrical factors in the most common production processes. The main issues of electrical safety and protection of workers engaged in work with electrical equipment are studied. Theoretical foundations of electrical safety. Technical measures and means of ensuring electrical safety, methods of monitoring their condition. Organization of safe operation of electrical installations	5		**v**			**v**						
Cycle of profile disciplines University component														
SAF123	Technical regulation and industrial safety	The course examines the legal foundations of the state system, technical regulation aimed at ensuring the safety of products, services and processes in the Republic of Kazakhstan. The course forms knowledge about the main provisions of technical regulation, legislative and regulatory acts in the field of	5			**v**				**v**				

		technical regulation.												
SAF 109	Fundamentals of Radiation Safety	The discipline provides theoretical and practical training of students on the issues of ensuring radiation safety, ensuring safe work with sources of ionizing radiation, their dosimetry and control. Gives practical skills to ensure radiation safety when working with sources of ionizing radiation.	5				v		v					
HYD472	Safety Expertise	The purpose of the course is to gain knowledge about the legislative framework for conducting a safety review, the composition of project documentation submitted for review, as well as practical skills in developing parts of sections of project documentation, stages, timing and specifics of its implementation. Course objectives: to get acquainted with the calculations of the main parameters of human and environmental protection means in relation to specific conditions based on known methods and systems; study the process of developing sections of projects related to safety issues; learn to provide engineering and design and author support for scientific research in the field of safety and technical implementation of	4			v				v				

		innovative developments; study the optimization of production technologies in order to reduce the impact of negative factors on humans and the environment; get acquainted with the organization of activities for the protection of the environment at the level of the enterprise, territorial production complexes and regions, and in emergency conditions; carrying out calculations of the technical and economic efficiency of measures aimed at improving the safety and environmental friendliness of production in order to make informed economic decisions.													
HYD471	Fire explosion safety	The purpose of the course: the acquisition by students of theoretical knowledge and practical skills necessary for: identifying the causes of fires and explosions; drawing up measures to eliminate fires and explosions; assessment of engineering solutions for fire and explosion protection of objects; selection and calculation of the required number of primary fire extinguishing agents; ability to use PPE. Legal support and basic concepts of fire safety. Types of combustion, combustible substances and materials. Analysis of the causes of fires.	6				**v**		**v**						

		Features of the occurrence and spread of fires. Buildings, structures, building structures, their division according to fire and explosion hazard. Fundamentals of regulation of fire prevention measures in construction. Heating, ventilation and electrical equipment of buildings. Protection against emergency explosions. Lightning protection. Automatic fire extinguishing systems. Fire alarm systems. Calculation of primary fire extinguishing means. Calculation of the time of evacuation of people in case of fire. Calculation of lightning protection of buildings and structures. Signal colors and fire safety signs. Fire communication and alarm.												
Cycle of profile disciplines Component of choice														
SAF121	Certification of production facilities for working conditions	The discipline forms students' knowledge about the preservation of human health and safety at work, designed to analyze and identify dangerous and harmful production factors, develop measures to protect people by assessing working conditions and reducing the level of impact of these factors to acceptable values.	5			**v**							**v**	
SAF	Occupational health and safety	The discipline gives students the	5					**v**		**v**				

115	management system	fundamental knowledge of labor protection management, which allows them to independently work on the organization of safe and healthy working conditions in the workplace. Competences are being formed to create healthy and safe working conditions, organizational and managerial methods in professional and social activities for labor protection.													
HYD458	Water resources management	The main objectives of the discipline “Water resources management” include issues of water use, water consumption and the protection of water resources in water basins, the study of methods for analyzing water consumption and water disposal, factors and patterns of water consumption and water disposal in industries in cities and towns.	5					**v**			**v**				
SAF128	Ergonomics and technical aesthetics	The discipline forms in students a complex of knowledge and skills for the analysis and modeling of production structures, taking into account the requirements of functional safety, ergonomics and technical aesthetics. Problems of adapting the production environment to the capabilities of the human body.	5					**v**			**v**				
SAF	Social protection of workers	The discipline provides students	5			**v**					**v**				

107		with a systematized knowledge of the general characteristics of the system of social protection of workers, sources of social security law, the effect of regulations in time, space and categories of workers, the financial, legal and organizational foundations of social protection of workers, the main mechanisms of social protection in the event of social risks and etc.													
HYD473	Rescue equipment and communications in emergency situations	Training of future specialists in solving issues of organization, planning and implementation of measures for the prevention and elimination of natural and man-made emergencies based on the requirements and norms of the current law in the Republic of Kazakhstan, the performance of work to rescue people in the conditions of destruction of buildings, in case of accidents, catastrophes and other emergencies situations, reducing the damage from their consequences.	4						**v**			**v**			
HYD474	Organization of the industrial safety service at the enterprise	The purpose of studying the discipline is the methods of a comprehensive assessment of the organization of work on labor protection through the transition to scientifically based management of the process of	4			**v**			**v**						

		ensuring labor safety, starting from the stage of creating and designing technologies and production facilities. The tasks of labor protection management, which require a comprehensive assessment of the safety of technological processes and equipment of automated production, are considered. The principles for the formation of complex indicators are outlined, taking into account the requirements and restrictions imposed by the measurement theory. The developed indicators and safety criteria are given. A comparative analysis of various principles of a comprehensive assessment is given, various methods and practices for assessing the industrial hazard of equipment and technological processes are described.												
HYD 457	Comfort of the room	The discipline "Comfort of the room" provides a systematic presentation of the provisions that represent the theoretical basis for studying the technology of providing a microclimate, the acquisition by students of theoretical knowledge and practical skills necessary to understand the processes and phenomena associated with the consideration of the	5					**v**			**v**			

		thermophysical foundations of the transfer of heat, moisture through the building envelopes of the air regime of the building, regulation of thermal regime using modern concepts of the theory of heat and mass transfer.												
SAF108	Rescue Safety	The discipline teaches students to solve issues of safe performance of work during rescue and other urgent work, the ability to analyze the situation when making decisions on safety in the performance of various rescue operations.	5						v			v		
SAF130	Recruitment and training of personnel	The purpose of mastering the discipline is to acquire knowledge, skills and abilities to train personnel for new activities; work with the personnel reserve (determination of the need, recruitment and promotion, main areas of training and related activities); selection, training and advanced training of managers and persons working with personnel; training and advanced training of scientists and specialists; sending personnel for training and advanced training, taking into account future needs; work with graduates of schools and universities; special forms of retraining and advanced training of personnel.	5								v		v	
SAF105	Social dangers	The discipline forms knowledge	5			v				v				

		and skills according to the types of social dangers, patterns of manifestation and development. Forecasting social dangers and dealing with the consequences. Dangers of terrorism, religious and interethnic conflicts. Extremism, religious sects in Kazakhstan. Social dangers of criminal origin and protection from them. Social vices and security measures.													
SAF 122	Personnel Protection Management in Disasters	The discipline contributes to the acquisition by students of a system of theoretical knowledge, practical skills and abilities to protect production personnel and the population, and ensure the sustainability of the functioning of technological processes and industries in emergency situations.	5				**v**					**v**			
HYD475	Process safety	The purpose of studying the discipline is to form fundamental knowledge of potentially hazardous technologies in the main industries (mining, metallurgical, engineering, oil, chemical, etc.) and the ability to make decisions in the event of adverse factors and dangerous situations; evaluate the safety of the technological properties of mining and processing of mineral raw materials for the purpose of its integrated use, navigate the	6				**v**		**v**						

		technology and production processes of developing industries to such an extent as to assess their safety, understand the decisions made in production on technological schemes and calculations, preventing possible negative consequences.												
HYD476	Monitoring of natural and man-made emergencies	The purpose of the study: training of specialists capable of carrying out activities for monitoring and forecasting emergency situations, for which it is necessary to study the system of observations and control, carried out regularly, to assess the state, analyze the processes occurring in it and timely identify trends in its change, in particular natural and man-made nature , anticipatory reflection of the probability of occurrence and development of emergencies based on an analysis of the possible causes of its occurrence, its source in the past and present; objects, types, methods of monitoring natural and man-made emergencies.	6						**v**			**v**		
SAF116	Rescue business	The course is designed to train future specialists in solving issues of organization, planning and implementation of measures to prevent and eliminate natural and man-made emergencies based on the requirements and	5						**v**			**v**		

		norms of the current law in the Republic of Kazakhstan, to perform work to save people in case of accidents, disasters and other emergencies, reduce the damage from their consequences.													
SAF145	Comprehensive assessment of the safety of technological processes	The discipline gives the basic concepts of the principles of regulation used in the design and operation of technological equipment and processes and is based on the provisions of the system of technical regulation and standardization in the field of industrial technologies.	5				**v**		**v**						

5. Curriculum of educational program

KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I.SATBAYEV

SATBAYEV UNIVERSITY

APPROVED
Chairman of the Management Board-
Rector of KazNRTU named after K.Satpayev
_____ M.M. Begentayev
«01» 09 2023

CURRICULUM
of Educational Program on enrollment for 2023-2024 academic year

Educational program 6B11201- "Occupational health and safety"
Group of educational programs B094 - "Sanitary and preventive measures"

Form of study: full-time **Duration of study: 4 years** **Academic degree: Bachelor of Engineering and Technology**

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	Classes in amount lec/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters							
								I course		II course		III course		IV course	
								1 semester	2 semester	3 semester	4 semester	5 semester	6 semester	7 semester	8 semester
CYCLE OF GENERAL EDUCATION DISCIPLINES (GED)															
M-1. Module of language training															
LNG 108	English language	GED, RC	10	300	0/0/6	210	E	5	5						
LNG 104	Kazakh (Russian) language	GED, RC	10	300	0/0/6	210	E	5	5						
M-2. Module of physical training															
KFK 101-104	Physical Culture	GED, RC	8	240	0/0/8	120	Difzachi	2	2	2	2				
M-3. Module of information technology															
CRE 677	Information and communication technologies (in English)	GED, RC	5	150	2/1/0	105	E				5				
M-4. Module of socio-cultural development															
HUM 137	History of Kazakhstan	GED, RC	5	150	1/0/2	105	SE		5						
HUM 132	Philosophy	GED, RC	5	150	1/0/2	105	E				5				
HUM 128	Socio-political knowledge module (sociology, politology)	GED, RC	3	90	1/0/1	60	E				3				
HUM 134	Socio-political knowledge module (culturology, psychology)		5	150	2/0/1	150	E			5					
M-5. Module of anti-corruption culture, ecology and life safety base															
HUM 130	Fundamentals of anti-corruption culture and law	GED, CCH	5	150	2/0/1	150	E			5					
MNG 489	Fundamentals of economics and entrepreneurship														
CIV570	Fundamentals of scientific research methods														
HYD 436	Ecology and life safety														
CYCLE OF BASIC DISCIPLINES (BD)															
M-6. Module of physical and mathematical training															
MAT 101	Mathematics I	BD, UC	5	150	1/0/2	105	E	5							
PHY 468	Physics	BD, UC	5	150	1/1/1	105	E	5							
MAT 102	Mathematics II	BD, UC	5	150	1/0/2	105	E		5						
M-7. Technosphere safety module															
GEN 429	Engineering and computer graphics	BD, UC	5	150	1/0/2	105	E	5							
HYD404	Physical and chemical processes in the technosphere	BD, UC	4	120	2/0/1	75	E	4							
HYD403	Technosphere safety management	BD, UC	5	150	1/0/2	105	E		5						
HYD405	Physical bases of noise protection	BD, UC	6	180	2/1/1*	120	E			6					
SAF119	Monitoring and measurement in environment	BD, UC	5	150	1/0/2	105	E				5				
SAF125	Calculation of damage from disability, accidents and environmental protection	BD, UC	5	150	1/0/2	105	E			5					
SAF 145	Organizational, legal and regulatory	BD, CCH	5	150	2/0/1	105	E			5					
HYD197	Potentially dangerous technologies														
SAF142	Industrial sanitation and occupational health	BD, UC	5	150	1/0/2	105	E				5				
SAF160	Collective and individual protective equipment	BD, UC	5	150	1/0/2	105	E					5			
HYD057	Economics of engineering systems	BD, CCH	5	150	2/0/1	105	E				5				
HYD407	Technogenic emergencies				1/0/2										
SAF 198	Potentially dangerous technologies	BD, UC	5	150	2/0/1*	105	E					5			
SAF127	Safety declaration of potentially dangerous objects	BD, UC	5	150	1/0/2	105	E					5			
SAF126	Reliability of technical systems and risk management	BD, UC	5	150	1/0/2	105	E					5			
HYD464	Occupational safety in work	BD, UC	4	120	2/0/1	75	E					4			
CIV126	Engineering systems of buildings and structures	BD, CCH	5	150	2/0/1*	105	E					5			
HYD484	Information technologies in life safety management				1/0/2										
SAF136	Emergency medicine	BD, UC	5	150	1/0/2*	105	E						5		
HYD469	Supervision and control in the field of safety	BD, UC	5	150	1/0/2*	105	E						5		
HYD098	Physiology and psychology of work	BD, CCH	5	150	1/0/2	105	E						5		
HYD440	Electrical safety														

HYD468	Chemical and biological safety	BD, CCH	6	180	2/1/1*	120	E								6				
HYD470	Occupational risk and its assessment																		
AAP184	Educational practice	BD, UC	2							2									
	CYCLE OF PROFILE DISCIPLINES (PD)																		
	M-8. Occupational health, ilndustrial safety and emergency safety module																		
SAF125	Technical regulation and industrial	PD, UC	5	150	2/1/0*	105	E								5				
SAF 109	Fundamentals of radiation safety	PD, UC	5	150	2/1/0*	105	E								5				
HYD471	Fire and explosion safety	PD, UC	6	180	2/1/1*	120	E								6				
HYD472	Safety expertise	PD, UC	4	120	2/1/0*	75	E									4			
SAF121	Certification of production facilities	PD, CCH	5	150	1/0/2	105	E									5			
SAF 115	Occupational safety management system																		
HYD473	Rescue equipment and emergency communications	PD, CCH	4	120	1/0/2	75	E									4			
					2/1/0*														
HYD468	Water resources management	PD, CCH	6	180	2/1/1*	120	E										6		
HYD475	Safety of technological processes																		
HYD476	Monitoring of natural and man-made emergencies																		
SAF 128	Ergonomics and technical aesthetics	PD, CCH	5	150	1/0/2	105	E										5		
SAF 107	Social defense of employees																		
SAF108	Safety of rescue operations	PD, CCH	5	150	1/0/2	105	E											5	
SAF130	Recruitment and training of personnel																		
HYD474	Organization of the industrial safety service in the enterprise	PD, CCH	4	120	1/0/2	75	E											4	
					2/1/0*														
HYD457	Comfort of the room	PD, CCH	5	150	1/0/2	105	E											3	
SAF165	Social hazards																		
SAF 122	Personnel protection management at emergency situations																		
SAF130	Emergency rescue case	PD, CCH	5	150	1/0/2	105	E											5	
SAF145	Integrated safety assessment of technological processes																		
AAP142	Production practice I	PD, UC	2								2								
AAP143	Production practice II	PD, UC	3												3				
	M-9. Module of final attestation																		
ECA108	final examination	FA	8																8
	M-10. Module of additional types of training																		
AAP900	Military affairs	ATT	0																
	Total based on UNIVERSITY:							31	29	28	32	29	31	33	27				
								60		60		60		60					

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
GED	Cycle of general education disciplines		51	5	56
BD	Cycle of basic disciplines		86	31	176
PD	Cycle of profile disciplines		75	30	
	Total for theoretical training:	*0*	*162*	*0*	*162*
FA	final attestation	8			8
	TOTAL:	8	0	0	240

Decision of the Academic Council of Kazatu named after K.Satpayev. Protocol № 5 от "24" 11 2022 y.

Decision of the Educational and Methodological Council of Kazatu named after K.Satpayev. Protocol № 30 от "17" 11 2022 y.

Decision of the Academic Council of the Institute _____ Protocol № 2 от "4" 10 2022y.

Vice-Rector for Academic Affairs — Zhautikov B.A.

Institute Director — Kaspangaliev B.U.

Department Head — Alimova K.K.

Specialty Council representative from — Kanbetseratov S.Sh.

6. Additional educational programs (Minor)

Name of additional educational programs (Minor) with disciplines	Total number of credits	Recommended semesters of study	Documents on the results of mastering the additional educational programs (Minor)
"Technospheric safety" SAF114 Industrial Safety Declaration SAF113 Environmental Engineering SAF229 Modeling in the Technosphere Safety Prediction System SAF218 Technique and technology of protection in the technosphere	20	5, 6, 7	Certificate