

## CATALOG OF ELECTIVE DISCIPLINES

### 6B11 - Services

(Code and classification of the field of education)

### 6B112 - Occupational health and safety

(Code and classification of the direction of training)

### 1020

(Code in the International Standard Classification of Education)

### B094 - Sanitary and preventive measures

(Code and classification of the educational program group)

### 6B11201 - Safety and Environmental Protection

(Code and name of the educational program)

(Level of preparation)

set of 2023

**Developed**

By the Academic Committee of the OP  
Head of AK Nurymkhan Gulnur Nesipbaevna  
Manager of the OP Bakirova Layla Saparbaevna

**Reviewed**

at the meeting of the Quality Assurance Commission of the Faculty of Engineering and Technology  
Recommended for approval by the Academic Council of the University  
Protocol No.4/6 of "10".04.2023  
Chairman of the Quality Assurance Commission G.B. Abdilova.

**Approved**

at the meeting of the Academic Council of the University  
Protocol №5 «21» 04. 2023  
Chairman of the Academic Council Oralkanova I.A.

## Basis of Biochemistry

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is aimed at studying the properties and functions of macromolecules (vitamins, enzymes, hormones), their biological role, classification, mechanism of action. The course deals with: metabolism and energy in the body; integration of cell metabolism; biochemical pathways for the transformation of proteins, carbohydrates, lipids, enzymes, vitamins, hormones; assimilation and dissimilation; anabolism and catabolism; stages of metabolism in the body; the relationship between the metabolism of proteins, nucleic acids, carbohydrates and lipids.*

### Purpose of studying of the discipline

*The study of molecular biochemical processes occurring in the cells and tissues of the animal body under various conditions. Acquisition of knowledge of the chemical foundations of life processes and biochemical processes that occur in the human body during physical exertion.*

### Learning Outcomes

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### Learning outcomes by discipline

*1) Demonstrate knowledge of the basic properties and functions of macromolecules.*

*2) Explain the biological role and mechanism of action of vitamins, enzymes, hormones.*

*3) Describe the stages of metabolism and energy in the body, as well as biochemical ways of converting proteins, carbohydrates, lipids, enzymes, vitamins, hormones.*

### Prerequisites

*Physics*

### Postrequisites

*Examination of fire and explosion hazard of production Fire safety industry Porownywanian industrial and civil objects*

## Fire safety

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is aimed at studying the legislative, legal and organizational issues of fire safety, the state system of fire protection of industrial and civil facilities, the environment. The course deals with: combustion and the properties of substances characterizing the explosion hazard; causes of fires; features of their occurrence and distribution; ways and means of extinguishing; lightning protection; automatic fire extinguishing and alarm systems; measures to ensure the fire safety of buildings.*

### Purpose of studying of the discipline

*Formation of fundamental knowledge on the prevention of fires and explosions at industrial and civil facilities, skills and abilities in the use of primary means of fire extinguishing, the study of modern means of fire extinguishing and fire and explosion protection.*

### Learning Outcomes

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### Learning outcomes by discipline

*1) Demonstrate knowledge of legislative, legal and organizational issues of fire safety, the state system of fire protection of industrial and civil facilities.*

*2) Analyze the causes of fires, the features of their occurrence and spread.*

*3) Develop measures to ensure the fire safety of facilities, applying in practice methods and means of extinguishing a fire.*

### Prerequisites

*Physics*

### Postrequisites

*Examination of fire and explosion hazard of production Fire safety industry Porownywanian industrial and civil objects*

## Theory of combustion and explosion

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The course covers: physico-chemical fundamentals of gorenje and gorenje processes; gorenje gorenje; composition of combustion products; Air consumption during combustion; smoke and flame; the concept of fire and explosion hazard; types of explosions and explosives; the main provisions of the theory of detonation; explosive shock wave; the effects of explosion on buildings and people; calculation of excess pressure during an explosion in a room.*

## **Purpose of studying of the discipline**

*Formation of students` knowledge about the laws of gorenje gorenje and explosion processes accompanying man-made human activity; study of physical and chemical laws of the occurrence, spread and cessation of burning in fires, as an integral part of the branch of knowledge about the state of protection of the individual and property from fires.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

- 1) Explain the physical foundations of the processes of combustion, explosion and detonation, the specifics of their occurrence and course.*
- 2) Describe the features of combustion and explosion of gas and dust-air mixtures, the physical basis of spontaneous combustion of substances.*
- 3) Predict the hazards of fire or explosion in various combinations in the space of a combustible oxidizer and an ignition source.*

### **Prerequisites**

*Physics*

### **Postrequisites**

*Examination of fire and explosion hazard of production Fire safety industry Porownywnia industrial and civil objects*

## **Methods and tools for monitoring and measuring**

Discipline cycle	Basic disciplines
Course	2
Credits count	3
Knowledge control form	Examination

### **Short description of discipline**

*The discipline includes the following questions: types of instruments, measuring instruments, instruments, characteristics of measuring instruments (parameters, properties, standardization, classification), verification, testing of measuring instruments, verification schemes, graduated, departmental tests, measurement methods, principles, change of measured values, analysis methods based on various measurement principles microclimate, ventilation systems, devices for monitoring the parameters of dust, gas collecting systems.*

### **Purpose of studying of the discipline**

*Formation of students` understanding of the relationship of measurement, testing and control processes with metrological support for the design, production and operation of products that are used in various fields of science and technology.*

### **Learning Outcomes**

*ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.*

*ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.*

### **Learning outcomes by discipline**

- 1) Describe the characteristics of measuring instruments including parameters, properties, standardization and classification.*
- 2) Use measuring instruments, verification schemes, graduated and departmental tests, measurement methods and principles.*
- 3) Demonstrate methods of analysis and control devices of the studied parameters.*

### **Prerequisites**

*School course*

### **Postrequisites**

*Manufacturing Practice I*

## **Methods of scientific research in life safety**

Discipline cycle	Basic disciplines
Course	2
Credits count	3
Knowledge control form	Examination

### **Short description of discipline**

*The discipline is related to scientific research and the design of life safety. The following issues are considered: research work of students; inventive and patent licensing work, structure and methodology of creative search, fundamentals of patent legislation, preparation and publication of an application for an invention; basic methods of cognition of creativity and science; fundamental approaches and experimental research; stages of research work and directions of choice at the research stage.*

### **Purpose of studying of the discipline**

*Training of specialists with high general scientific and professional training, capable of independent creative work, having an idea of methodological patterns common to all sciences.*

### **Learning Outcomes**

*ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.*

*ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.*

### **Learning outcomes by discipline**

- 1) Own research, inventive and patent-licensed work and compile publications and applications for an invention.*
- 2) Describe the structure and methodology of creative search, the basis of patent legislation.*
- 3) Demonstrate the main stages and directions of the choice of research work.*

### **Prerequisites**

*School course*

### **Postrequisites**

## Regulatory standards in the protection of the environment

Discipline cycle	Basic disciplines
Course	2
Credits count	3
Knowledge control form	Examination

### Short description of discipline

*The discipline is focused on environmental quality standards. The following issues are considered: rationing of atmospheric air quality; hygienic rationing of the working area; quality standards of reservoirs and soil; normalization of soil quality and soil diversity; normalization of the quality and state of biota; integral way of ecological rationing; food quality; standards of the physical state of the environment; standards of sanitary and protective zones, permissible emissions and discharges, education waste.*

### Purpose of studying of the discipline

*To form ideas about the theoretical and methodological foundations of environmental regulation, about current trends in the development of the environmental regulatory framework and its application for the development of environmental standards for environmental protection facilities.*

### Learning Outcomes

*ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.*

*ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.*

### Learning outcomes by discipline

- 1) To model issues of environmental quality regulation based on current standards.*
- 2) Understand the integral way of environmental regulation.*
- 3) Explain the standards of the physical state of the environment, permissible emissions and discharges, waste generation.*

### Prerequisites

*School course*

### Postrequisites

*Manufacturing Practice I*

## Recovery technology and recycling of waste production and consumption

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline focuses on waste management methods. The following issues are considered: processing, disposal of solid household waste; technological process of processing industrial waste; burial, incineration; disposal of paper, glass containers, plastic packaging, slag, ash, residues of petroleum products; disposal of agricultural waste; recycling, auto-recycling; microbial waste treatment; disposal of containers and packaging; reuse of containers made of polymer materials.*

### Purpose of studying of the discipline

*Understanding the mechanisms of waste generation, studying the concept of waste management, as well as studying the processes of waste disposal and recycling.*

### Learning Outcomes

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### Learning outcomes by discipline

- 1) Describe the main methods of waste management, recycling and disposal.*
- 2) To model the technological process of processing industrial waste, taking into account their morphological composition.*
- 3) Explain the purpose of car recycling and the process of agricultural waste disposal.*

### Prerequisites

*Methods of scientific research in life safety Methods and tools for monitoring and measuring Regulatory standards in the protection of the environment*

### Postrequisites

*Basics of marketing and management in environmental engineering Innovative technologies to protect the environment Engineering ecology*

## Disposal, disposal and disposal of industrial waste

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is aimed at the general characteristics of waste, their structure, classification, the causes of formation. The following issues are considered: industrial, toxic, household, radioactive waste; waste disposal in Kazakhstan; the impact of waste on the environment; ways to solve problems with production, consumption waste; the Law of the Republic of Kazakhstan «On Production and Consumption Waste»; requirements of international conventions and agreements on the control of transboundary movement of hazardous waste and their disposal.*

## **Purpose of studying of the discipline**

*Consideration of the main currently existing and promising methods of utilization and processing of agricultural and industrial waste.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

*1) Demonstrate knowledge of waste characteristics, their structure, classification and causes of formation.*

*2) Analyze waste disposal in Kazakhstan, their impact on the environment and develop ways to solve problems with production and consumption waste.*

*3) Possess the basic provisions of the Law of the Republic of Kazakhstan "On Production and Consumption Waste", as well as the requirements of international conventions on the control of transboundary movement of hazardous waste.*

### **Prerequisites**

*Methods of scientific research in life safety Methods and tools for monitoring and measuring Regulatory standards in the protection of the environment*

### **Postrequisites**

*Basics of marketing and management in environmental engineering Innovative technologies to protect the environment Engineering ecology*

## **Recovery, recycling and disposal of consumer waste**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

*When studying the discipline, the formation of waste as a result of human activity is considered. The following issues are highlighted: waste disposal processes in a historical perspective; waste classification and basic approaches to the process of their disposal; landfill disposal; disposal as a method of disposal, disadvantages; collection, neutralization of filtered water; production, disposal of biogas; organization of collection, disposal of municipal solid waste in urban conditions, solid waste recycling.*

### **Purpose of studying of the discipline**

*Consideration of the main currently existing and promising methods of utilization and processing of agricultural and industrial waste.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

*1) Demonstrate knowledge of waste generation, their classification and possible disposal directions.*

*2) Possess techniques for technological support of landfill collection, neutralization and disposal of waste.*

*3) To develop the organization and processing of collection and disposal of solid household waste in urban conditions.*

### **Prerequisites**

*Methods of scientific research in life safety Methods and tools for monitoring and measuring Regulatory standards in the protection of the environment*

### **Postrequisites**

*Basics of marketing and management in environmental engineering Innovative technologies to protect the environment Engineering ecology*

## **Rescue case**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

*The discipline is devoted to the organizational foundations of emergency rescue. The course deals with the following issues: search for victims; survey of the rescue site; dismantling, collapse of building structures; extinguishing fires in destroyed buildings, dumps; rescue operations during the liquidation of natural emergencies; features of rescue operations during the elimination of industrial accidents; measures to ensure the safety of rescuers and victims; the procedure for the use of funds and forces for carrying out emergency rescue operations.*

### **Purpose of studying of the discipline**

*Training of specialists with high professional training for scientific, design and engineering activities in the field of emergency rescue, capable of carrying out rescue and other urgent work in emergency zones, which are carried out in order to save people and provide assistance to victims, localize and eliminate the consequences of emergencies and create conditions for subsequent restoration work.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

*1) Understand the social significance of professional activity, in the process of organizing emergency rescue operations and managing*

the emergency rescue service.

2) Make competent organizational and managerial decisions in emergency situations.

3) Predict possible consequences of accidents, catastrophes, natural disasters, from the use of modern means of destruction.

#### **Prerequisites**

*Doxologia The modern world of dangers Basics of protection from the dangers*

#### **Postrequisites**

*Rescue equipment and basic machine Logistical and logistical support Methods and means of protection in emergency situations*

### **Facilities in extreme conditions**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

#### **Short description of discipline**

*The discipline is aimed at studying the condition of buildings and structures operated in seismic areas, in areas of flooding, in conditions of systemic effects of high-tech, low temperatures, aggressive environment, in conditions of structurally unstable soils. Assessment of the condition of load-bearing and enclosing structures of buildings, structures located in a dangerous area in emergency situations, taking into account the peculiarities of the work of building structures during the liquidation of the consequences of an emergency situation.*

#### **Purpose of studying of the discipline**

*Formation of professional knowledge and practical skills in the construction of buildings and structures of a normative quality level based on the study of industrial methods of construction of various types of buildings and structures based on effective building materials and technologies taking into account various construction conditions.*

#### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

#### **Learning outcomes by discipline**

1) Demonstrate knowledge of the operation of buildings and structures in extreme conditions.

2) Assess the condition of load-bearing and enclosing structures of buildings in emergency situations.

3) Take into account the features of building structures when eliminating the consequences of an emergency.

#### **Prerequisites**

*Doxologia The modern world of dangers Basics of protection from the dangers*

#### **Postrequisites**

*Rescue equipment and basic machine Logistical and logistical support Methods and means of protection in emergency situations*

### **Building construction**

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

#### **Short description of discipline**

*The issues are considered in the study of disciplines: modern building structures and their application; load and effects; types of building structures – permanent, wooden, reinforced concrete and stone; areas of their application; reduction of pro reinforced concrete; prevailing and scarce reinforced concrete; sanctity of reinforced concrete structures; types of reinforced concrete structures; principles of design of stone and reinforced concrete structures; material for stone structures; armokmen structures; solid structural scheme of construction.*

#### **Purpose of studying of the discipline**

*Formation, calculation and construction of load-bearing and enclosing structures, based on their purpose and purposes of use, the ability to choose the right materials, cross-section shape, design assembly scheme, ensuring compliance with the required indicators of reliability, efficiency, efficiency; the ability to develop solutions for newly erected or reinforced simple buildings and structures; the ability to calculate structural elements of buildings and structures.*

#### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

#### **Learning outcomes by discipline**

1) Explain modern approaches to the use of materials for building structures.

2) Classify types of building structures, characterize their properties and applications.

3) Master the principles of designing buildings made of reinforced concrete and stone structures, develops a structural diagram of the building.

#### **Prerequisites**

*Doxologia The modern world of dangers Basics of protection from the dangers*

#### **Postrequisites**

*Rescue equipment and basic machine Logistical and logistical support Methods and means of protection in emergency situations*

### **The reliability of technical systems and risk management**

Discipline cycle	Basic disciplines
------------------	-------------------

Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the criteria of reliability of technical systems and building structures, the basics of risk theory. The course deals with the following issues: the normative value of reducing the risk of risk; means of reducing the risk of injury to technical systems; rules for the reliability of technical systems; physical causes of damage, failures; reliability of restored objects. analysis of technogenic hazards; ensuring the safety of technical systems, risk management; analysis of technogenic hazards at the design and operation stage.

### Purpose of studying of the discipline

Formation of a system of knowledge about the reliability of technical systems and the threat of a violation of the safety of life in the technosphere - the formation of practical skills for the prevention (or response) of phenomena (consequences) of man-made or natural emergencies. Social causes: traffic accidents, accidents, environmental pollution (including chemical and physical, in particular, ionizing effects), fires, terrorist acts, etc., training of a specialist in the field of fire safety.

### Learning Outcomes

ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.

ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.

### Learning outcomes by discipline

- 1) Analyze, evaluate, make decisions and plan work in emergency situations.
- 2) Organize the implementation of measures aimed at determining the levels of emergency danger, establish the boundaries of dangerous zones, calculate forces and means.
- 3) To predict the socio-economic consequences of emergency situations, providing priority living conditions for the affected population.

### Prerequisites

Rescue case Facilities in extreme conditions Building construction

### Postrequisites

Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations

## The organization and management of rescue in emergency situations

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is devoted to the organization of search, rescue operations. During the training, the following issues will be considered: management of rescue operations; organization of duty, alerts, communications; organization, procedure for emergency response, rescue operations; organization of management of forces, means in the area of the accident; organization of search, rescue operations during emergency response; organization of complex intelligence with the involvement of specialists-chemists, engineers, firefighters, doctors. Organization of evacuation measures in emergency situations of peacetime and wartime.

### Purpose of studying of the discipline

To provide students with knowledge in the organization, coordination, management and conduct of search and rescue operations in the shortest possible time, with minimal costs and losses in order to save people and provide assistance to victims. To predict and make competent decisions in emergency situations to protect the population and production personnel of economic facilities from the possible consequences of accidents, catastrophes, natural disasters and the use of modern means of destruction, as well as during the elimination of these consequences.

### Learning Outcomes

ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.

ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.

### Learning outcomes by discipline

- 1) To know the issues of certification of emergency rescue units in the territory of the Republic of Kazakhstan.
- 2) Formulate emergency rescue teams during an emergency situation, manage urgent measures to protect the population in case of accidents, natural disasters.
- 3) Organize and plan work in case of emergency.

### Prerequisites

Rescue case Facilities in extreme conditions Building construction

### Postrequisites

Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations

## Protection against negative factors in the technosphere

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at studying the basic concepts and definitions of negative factors in the technosphere, the legal framework in the field of personnel protection. The course covers the following issues: classification of respiratory protection; Overalls, shoes; classification of hand protection; skin protection; measures to ensure collective protection; marking of hazardous areas; safety signs, evacuation schemes.



### **Purpose of studying of the discipline**

*Future specialists to create safe and harmless living conditions; in emergency situations: protection of the population and production personnel of economic facilities from possible consequences, disasters, natural disasters and the use of modern means of destruction; equip with theoretical knowledge and practical skills necessary to eliminate the consequences of destruction.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

*1) Master the basic concepts and legal bases in the field of providing means of protection of the population and personnel.*

*2) Demonstrate basic knowledge of practical training, analysis and expertise of the activities of economic facilities, organizations and institutions to the requirements of life safety and environmental protection.*

*3) Use methods to protect production personnel and the public from possible consequences of emergencies, accidents and catastrophes.*

### **Prerequisites**

*Rescue case Facilities in extreme conditions Building construction*

### **Postrequisites**

*Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations*

## **Engineering ecology**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

*The discipline is aimed at studying the relationship of man with the natural system, the state of the resources of the natural system and their use, the most important environmental problems of our time. The course covers: industry and the environment; pollution of the atmosphere and hydrosphere; regulation of environmental quality; draft standards for maximum allowable emissions, maximum allowable discharges; methods of purification of industrial emissions, bioprotective equipment; methods and technical means of protection of water objects, neutralization, utilization of industrial wastes.*

### **Purpose of studying of the discipline**

*To acquaint students with the main stages of the formation of the relationship between man and nature; the sources of industrial pollution of the environment, the impact of industrial pollution on living organisms; to show the contradictions between the production of material goods, the laws of the development of the natural system with environmental resources and the peculiarities of their use; to form theoretical knowledge and practical skills in the field of environmental protection, ecological outlook and environmental culture.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

*1) To explain the functioning of industrial production and their impact on various components of the biosphere, to carry out the greening of technological processes.*

*2) Analyze permissible emissions, discharges of pollutants and calculate environmental and economic damage.*

*3) Assess the total impacts of industrial pollution and plan environmental protection measures.*

### **Prerequisites**

*Environmental pollution*

### **Postrequisites**

*Environmental safety of Kazakhstan Ecological safety of the environment Ecology of Kazakhstan*

## **Innovative technologies to protect the environment**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

*The course deals with: the concept of innovation and innovation; informatics as an innovation in environmental protection; available information technologies, their features. The discipline is aimed at studying management of environmental protection, information flows in the environmental management system, their classification, trends in the development of information technology, electronic data collection system, building a system of complex indicators of the state of the environment.*

### **Purpose of studying of the discipline**

*Formation of modern ideas about the introduction and promotion of eco-innovations as technologies and tools for improving environmental protection.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

- 1) Explain the concept of innovation, the importance and features of information technologies in environmental protection, trends in their development.
- 2) Classify and analyze information flows in the environmental management system.
- 3) Organize electronic data collection systems to build a system of integrated environmental indicators.

### **Prerequisites**

*Environmental pollution*

### **Postrequisites**

*Environmental safety of Kazakhstan Ecological safety of the environment Ecology of Kazakhstan*

## **Basics of marketing and management in environmental engineering**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

*The discipline is aimed at studying the theoretical and methodological foundations of marketing and management in engineering ecology, the principles, methods and organization of management, the theory of motivation in management. The course covers: modern concepts of marketing; strategy, planning and control of marketing; marketing communication; competitive positions and advantages; international marketing of the enterprise; international and Kazakhstani environmental management standards; ISO 14001 requirements for environmental management system.*

### **Purpose of studying of the discipline**

*Mastering the basic provisions of the strategy and tactics of management and marketing in environmental engineering and environmental management, obtaining a sufficient set of ideas about the role and place of environmental management and marketing in the overall system of environmental and natural resource activities and achieving a reasonable understanding of the prospects for the development of these areas.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

- 1) Formulate theoretical and methodological foundations of marketing and management in environmental engineering.
- 2) Demonstrate modern concepts, strategy, planning, control and marketing management.
- 3) To apply in practice international and Kazakhstan environmental management standards, requirements of ISO 14001 standard to the environmental management system

### **Prerequisites**

*Environmental pollution*

### **Postrequisites**

*Environmental safety of Kazakhstan Ecological safety of the environment Ecology of Kazakhstan*

## **Production sanitation**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

*The discipline is aimed at studying the concepts of industrial sanitation, the basics of labor physiology, and sanitary standards for the design of enterprises. The course covers: microclimate parameters and methods for creating comfortable conditions; industrial dust and protection against harmful substances in the air; Ventilation and air conditioning; industrial lighting; noise, vibration, ultrasound as industrial hazards; means of control and protection against acoustic vibrations; industrial poisons and poisonings; non-ionizing electromagnetic fields and radiation.*

### **Purpose of studying of the discipline**

*Theoretical and practical training of students on industrial sanitation and occupational hygiene, including a system of organizational and sanitary measures and means to prevent exposure to hazardous and harmful production factors (physical, chemical, biological and psychophysiological) and ensuring a high level of efficiency with the least likelihood of occupational diseases associated with human labor.*

### **Learning Outcomes**

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### **Learning outcomes by discipline**

- 1) Possess theoretical and practical training in industrial sanitation and occupational hygiene.
- 2) To propose a system of organizational and sanitary measures and means to prevent exposure to workers in hazardous and harmful production factors.
- 3) To show a high level of efficiency with the least probability of occurrence of occupational diseases associated with human labor activity.

### **Prerequisites**

*Doxologia The modern world of dangers Basics of protection from the dangers*

## Postrequisites

Occupational Safety and Health

## Industrial Ventilation

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is aimed at studying the theoretical foundations of ventilation, its classification, the state of the atmosphere of industrial enterprises and the thermal regime of premises. The course covers: calculation and aerodynamic bases of air exchange; resistance of air ducts and ventilation schemes; devices for air heating and ventilation air purification; control of air distribution in the ventilation network; noise and vibration control in ventilation systems; technical testing and operation of ventilation systems.*

### Purpose of studying of the discipline

*Formation of a system of knowledge on the basics of the theory and practice of industrial ventilation design, familiarization with the scientific foundations, technical means and practical ways of creating and maintaining normal atmospheric conditions and the required degree of air purity in the workplace and in the human habitation zone in production conditions.*

### Learning Outcomes

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### Learning outcomes by discipline

- 1) Formulate the theoretical foundations of ventilation, its classification and the state of the thermal regime of the premises.*
- 2) Propose a calculation and ventilation scheme taking into account the aerodynamic fundamentals of air exchange and resistance of air ducts.*
- 3) Describe the procedure for technical testing and operation of the ventilation system.*

### Prerequisites

*Doxologia The modern world of dangers Basics of protection from the dangers*

### Postrequisites

Occupational Safety and Health

## Physical factors in the workplace

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is aimed at studying the identification, classification and nomenclature of physical factors in the workplace, as well as their characteristics and possible effects on the human body. The course deals with: protecting a person from harmful and dangerous physical production factors; providing safe and comfortable working conditions; management of labor safety at the enterprise; first aid to the injured.*

### Purpose of studying of the discipline

*Formation of fundamental knowledge about the presence of dangerous and harmful physical factors in the workplace, skills related to the use of methods and means of their measurement and control.*

### Learning Outcomes

*ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.*

*ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.*

### Learning outcomes by discipline

- 1) Demonstrate knowledge of identification, classification and characteristics of physical factors of the working environment, their impact on the human body.*
- 2) Develop a set of protective measures against the effects of harmful and dangerous physical production factors.*
- 3) Plan the occupational safety management system at the enterprise.*

### Prerequisites

*Doxologia The modern world of dangers Basics of protection from the dangers*

### Postrequisites

Occupational Safety and Health

## Government regulation of environmental quality

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

*The discipline is focused on the goals and methods of state regulation of environmental quality with consideration of the following issues: the theoretical basis of economic rationing and the concept of environmental rationing; sanitary and hygienic and ecosystem rationing; quality standards: sanitary and hygienic, environmental, industrial and economic; air quality control; environmental and*

regulatory control over the implementation of environmental quality standards; geochemical aspects of environmental regulation; anthropoecological aspect of economic regulation of environmental quality.

### **Purpose of studying of the discipline**

To familiarize students with the types of environmental activities, the system of norms and rules. regulatory documentation, design, environmental protection, rational use of natural resources, environmental safety, as well as with environmental expertise and audit.

### **Learning Outcomes**

ON10 Apply in practice the knowledge of the basics of conducting production processes from the possible consequences of emergencies, accidents and catastrophes.

ON11 Analyze, evaluate and make decisions on the problems of the current state of life safety, based on the achievements of science and practice of domestic and foreign experience

### **Learning outcomes by discipline**

- 1) Possess the theoretical basis of economic and environmental regulation.
- 2) To apply in practice the quality standards of sanitary and hygienic and ecosystem rationing.
- 3) Demonstrate environmental and regulatory control over the implementation of environmental quality standards.

### **Prerequisites**

Environmental pollution

### **Postrequisites**

Environmental safety of Kazakhstan Ecological safety of the environment Ecology of Kazakhstan

## **Specially protected natural territories**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline provides for the study of the following issues: biodiversity of state nature reserves and national parks of desert zones; biodiversity of state nature reserves and national parks of foothills; biodiversity of national parks of state nature reserves and steppe zones; biological diversity of wetlands; weakening of biodiversity; deterioration of flora and fauna; international cooperation; protection of wildlife in Kazakhstan; specially protected natural areas of Kazakhstan.

### **Purpose of studying of the discipline**

Formation of ecological culture and literacy of students, awareness of the role of specially protected natural areas in solving environmental problems associated with the use of forest resources, mineral and fuel and energy resources, the consequence of which is the violation and degradation of natural ecosystems in large areas.

### **Learning Outcomes**

ON10 Apply in practice the knowledge of the basics of conducting production processes from the possible consequences of emergencies, accidents and catastrophes.

ON11 Analyze, evaluate and make decisions on the problems of the current state of life safety, based on the achievements of science and practice of domestic and foreign experience

### **Learning outcomes by discipline**

- 1) To characterize the biodiversity of state nature reserves and national parks.
- 2) Analyze the biodiversity of state nature reserves and national parks of foothills and steppe zones.
- 3) Describe the biological diversity of wetlands, flora and fauna.

### **Prerequisites**

Environmental pollution

### **Postrequisites**

Environmental safety of Kazakhstan Ecological safety of the environment Ecology of Kazakhstan

## **Modern ecological environmental problems**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

In the course of studying the discipline, the following issues are considered: general overview of environmental problems; negative impact of human activities; use of water resources and their protection; features of atmospheric air pollution; degradation and protection of soil; current state of forest ecosystems; physical pollution of the environment; environmental pollution and impact on public health; environmental problems of cities and urban settlements.

### **Purpose of studying of the discipline**

To acquaint students with the environmental problems of our time, their causes and solutions, to form an idea of the unity of society and nature, the ways of sustainable development of civilization.

### **Learning Outcomes**

ON10 Apply in practice the knowledge of the basics of conducting production processes from the possible consequences of emergencies, accidents and catastrophes.

ON11 Analyze, evaluate and make decisions on the problems of the current state of life safety, based on the achievements of science and practice of domestic and foreign experience

### **Learning outcomes by discipline**

- 1) Analyze the overview of environmental problems and the negative impact of human activities on the environment.
- 2) To solve the issues of atmospheric air pollution, soil degradation and protection, the current state of forest ecosystems.
- 3) Predict competent solutions to environmental problems of cities and urban settlements.

### **Prerequisites**

Environmental pollution

## Postrequisites

Environmental safety of Kazakhstan Ecological safety of the environment Ecology of Kazakhstan

## Logistical and logistical support

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the planning of logistics in an emergency. The following issues are considered: assembly systems of material and technical support; the choice of a vehicle; warehousing; replenishment of excess stocks, an urgent delivery contract, the impact of material support on the performance of tasks to prevent and eliminate the consequences of emergencies; forces and means of material support, their composition and the ability to ensure and implement emergency measures; stocks of material resources, their regulation.

### Purpose of studying of the discipline

The purpose of the discipline is to master theoretical knowledge and practical skills in organizing logistical support for emergency situations and civil defense both in peacetime and in wartime during the prevention and elimination of the consequences of emergency situations.

### Learning Outcomes

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### Learning outcomes by discipline

- 1) Plan logistical and logistical support in an emergency.
- 2) To solve organizational and managerial tasks to increase the stability of the functioning of territorial-industrial complexes.
- 3) Perform tasks of material support for the prevention and elimination of the consequences of emergencies.

### Prerequisites

Rescue case Facilities in extreme conditions Building construction

### Postrequisites

Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations

## Methods and means of protection in emergency situations

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the basic principles of protection, reduction of the level of dangerous factors in emergency situations. The course covers the following issues: means of collective, individual protection; permissible impact of harmful factors on humans, the environment; the concept of the maximum permissible level of harmful factor, the principles of its construction; classification of harmful substances by type, aggregate state, nature of action; protection from chemical, biological negative factors; protection from air pollution.

### Purpose of studying of the discipline

Preparation of students for creative solution of issues of management of protection of workers in emergency situations, taking into account the current legislation and regulatory legal acts. In the process of studying the discipline, students must master a systematic approach to the organization of the management of the protection of workers and employees at enterprises and organizations of all forms of ownership.

### Learning Outcomes

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### Learning outcomes by discipline

- 1) Classify harmful substances by type and aggregate state.
- 2) Explain the basic principles of protection to reduce the level of hazards in an emergency.
- 3) Use means and methods of collective and individual protection from the effects of harmful factors.

### Prerequisites

Rescue case Facilities in extreme conditions Building construction

### Postrequisites

Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations

## Rescue equipment and basic machine

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is based on the study of rescue equipment and basic machines, means of communication, technological capabilities of machines and provides for the following issues: rescue equipment, means of communication; search and rescue and emergency rescue equipment; road-earth tools; lifting equipment; water supply and power supply; means of small mechanization; organization of communication in emergency situations, ensuring the reliability of management; operation of short-wave, ultrashort portable radio stations.

### Purpose of studying of the discipline

To consider the technical characteristics, general structure and purpose of the main types of rescue equipment and basic machines, the procedure for the use of stationary and mobile means of maintenance and repair of rescue equipment and basic machines; to indicate

the main brands and characteristics of fuels and lubricants used on samples of rescue equipment and basic machines; to study the main provisions and ways of use for the organization of technical maintenance, restoration and storage of rescue equipment and basic machines.

### Learning Outcomes

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### Learning outcomes by discipline

1) Demonstrate knowledge of the technical characteristics, general design and purpose of the main samples of rescue equipment and basic machines.

3) *Формулировать основные положения организации технического обслуживания, восстановления и хранения спасательной техники и базовых машин, пути снижения эксплуатационных расходов.*

3) Formulate the main provisions of the organization of maintenance, restoration and storage of rescue equipment and basic machines, ways to reduce operating costs.

### Prerequisites

Rescue case Facilities in extreme conditions Building construction

### Postrequisites

Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations

## Ecological safety of the environment

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at studying legislative acts principles of ensuring environmental safety, as well as problems and ways to solve them (climate change, ozone layer destruction, biodiversity conservation, desertification, land degradation, environmental disaster zones, problems associated with the development of the resources of the Caspian Sea shelf, the impact polygons of the military space, test complexes, radioactive, chemical and bacteriological contamination). Issues of environmental monitoring, statistics, international cooperation are considered.

### Purpose of studying of the discipline

To prepare future specialists for scientific and practical work in the field of environmental safety and environmental protection.

### Learning Outcomes

ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.

ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.

### Learning outcomes by discipline

1) Apply in practice the main provisions of legislative acts and principles of environmental safety.

2) Analyze the problems of environmental safety of the environment and outline ways to solve them.

3) Assess the state of environmental monitoring, statistics and international cooperation.

### Prerequisites

Basics of marketing and management in environmental engineering Innovative technologies to protect the environment Engineering ecology

### Postrequisites

Industrial toxicology

## Environmental safety of Kazakhstan

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at studying the state problems of environmental safety of the Republic of Kazakhstan, the relevance, basic principles of their provision. The course covers: global, national, local environmental problems, issues of greening the economy, legislation and society, as well as international cooperation of the Republic of Kazakhstan in the field of environmental protection and nature management, international environmental conventions, agreements ratified by the Republic of Kazakhstan.

### Purpose of studying of the discipline

To train young specialists who know the basic principles of environmental safety, focused on the transition to sustainable development; to familiarize students with the main strategic directions of state policy in the field of environmental safety of the Republic of Kazakhstan; to form theoretical knowledge and practical skills in the field of environmental safety, environmental outlook and environmental culture, taking into account the future professional activity of the student.

### Learning Outcomes

ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.

ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.

### Learning outcomes by discipline

1) Analyze the ecological state and environmental problems in the Republic of Kazakhstan, the principles of ecological zoning, the levels of environmental destruction of the environment.

2) Reflection of legal aspects of solving environmental problems in the Republic of Kazakhstan.

3) To establish the causes of environmental destabilization and is a set of measures for the protection and rational use of natural resources of the Republic of Kazakhstan

### Prerequisites

Basics of marketing and management in environmental engineering Innovative technologies to protect the environment Engineering ecology

### Postrequisites

Industrial toxicology

## Ecology of Kazakhstan

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at studying the fundamental concepts, problems and aspects of the ecology of the atmosphere, hydrosphere, soils of Kazakhstan, the impact of rocket components and test sites on the environment. The course covers: production and consumption waste and ways to solve them, the radioecological situation in Kazakhstan, biodiversity, environmental education, upbringing, law, as well as issues related to state policy and management system in the field of environmental protection.

### Purpose of studying of the discipline

Acquire knowledge in the field of ecology and biological diversity, and professionally carry out practical activities for environmental protection and sustainable development in the Republic of Kazakhstan.

### Learning Outcomes

ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.

ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.

### Learning outcomes by discipline

- 1) To master the fundamental concepts and problems of the ecology of Kazakhstan, to determine the ways to solve them.
- 2) To confirm the need for the development of environmental law, education and upbringing.
- 3) Demonstrate knowledge of issues of state policy and management system in the field of environmental protection.

### Prerequisites

Basics of marketing and management in environmental engineering Innovative technologies to protect the environment Engineering ecology

### Postrequisites

Industrial toxicology

## Safety engineering and technology

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at studying the basic definitions and concepts, requirements for the safety of equipment and technology, labor safety in the mechanization and automation of production, the safety of electric and gas welding, the safety of the operation of hoisting and transport machines and mechanisms. The course covers: requirements for working with dangerous goods; safety requirements in the manufacture and testing of new samples; safety of transportation of people and goods by vehicles; safe operation of pressure vessels.

### Purpose of studying of the discipline

Teaching students fundamental theoretical and practical training in solving organizational and managerial tasks of ensuring occupational safety, in the design of technological processes and equipment and in the process of their operation.

### Learning Outcomes

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### Learning outcomes by discipline

- 1) Demonstrate engineering knowledge in the field of ensuring the safe functioning of potentially hazardous technological processes, the reliability of machines and equipment during their operation from the effects of hazardous factors.
- 2) Analyze the causes of failures and malfunctions during the operation of technological equipment.
- 3) To carry out measures for the prevention of occupational injuries and occupational diseases.

### Prerequisites

Physical factors in the workplace Industrial Ventilation Production sanitation

### Postrequisites

Security engineering systems and networks Process safety Foundations of PA management and safety systems of Hermetic

## Safety of technological processes and equipment

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The course covers: the regulatory and technical base that defines the rules for industrial safety of technological processes and equipment; supervision and control in the field of security; technological process of production, its types and essence; devices, machines and communications for carrying out technological processes; theoretical foundations and methods for studying production technology; fire hazard analysis of process equipment; fire safety of technological processes of production.

### Purpose of studying of the discipline

Familiarization with the safety requirements for production processes and equipment.

### **Learning Outcomes**

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### **Learning outcomes by discipline**

- 1) To supervise and control the safe functioning of technological processes and equipment, applying the regulatory and technical framework.
- 2) Describe the technological process, its types and essence, equipment and communications for its safe conduct.
- 3) Analyze the state of fire safety of technological processes.

### **Prerequisites**

Physical factors in the workplace Industrial Ventilation Production sanitation

### **Postrequisites**

Security engineering systems and networks Process safety Foundations of PA management and safety systems of Hermetic

## **Ergonomics of production processes**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline is aimed at studying the object of ergonomics, the role of man in the safety of the «man and machine» system, its characteristics. The course examines: the development of ergonomics and its current state; tasks and structure of ergonomics, errors, violations, failures, failures; basic methods of ergonomics; adaptation of working conditions and tools to man; ergonomic requirements for the organization of workplaces, the arrangement of machines; optimization of working movements and controls.

### **Purpose of studying of the discipline**

Formation of economic thinking

### **Learning Outcomes**

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### **Learning outcomes by discipline**

- 1) To characterize the object of ergonomics and the role of man in the safe functioning of the "man and machine" system.
- 2) Demonstrate knowledge of the current state of ergonomics, its tasks and structure, basic methods, possible errors and violations.
- 3) To put into practice ergonomic requirements for the organization of workplaces, the device of machines and their controls.

### **Prerequisites**

Physical factors in the workplace Industrial Ventilation Production sanitation

### **Postrequisites**

Security engineering systems and networks Process safety Foundations of PA management and safety systems of Hermetic

## **Security rescue operations in emergency situations**

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline examines the basics of ensuring the safety of rescue operations in an emergency. The course includes the following issues: dangerous and harmful factors during rescue operations and other urgent work in an emergency situation; the legal basis for ensuring the safety of rescue operations; rules and regulations of labor protection, modes of labor activity of rescuers; socio-economic issues of labor protection; ensuring the safety of rescue operations in the affected area of an emergency situation.

### **Purpose of studying of the discipline**

Training in the basics of safety of rescue operations, including the principles of ensuring the safety of emergency rescue operations, description of the production environment when carrying out work, Occupational Safety and safety measures when carrying out rescue operations in emergency situations.

### **Learning Outcomes**

ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.

ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.

### **Learning outcomes by discipline**

- 1) Understand the social significance of professional activity with the protection of human rights and health, including the organization and management of emergency rescue, emergency rescue service in a threat.
- 2) Make organizational and managerial decisions in emergency situations.
- 3) To predict competent solutions for the protection of the population and production personnel, economic facilities in emergency situations from the consequences of possible accidents, catastrophes, natural disasters and the use of modern means of destruction.

### **Prerequisites**

Protection against negative factors in the technosphere The reliability of technical systems and risk management The organization and management of rescue in emergency situations

### **Postrequisites**

Tactics of rescue and elimination of consequences of emergency situations Organization of rescue operations Rescue work carried out in an emergency

## **Safety rescue**

Discipline cycle	Basic disciplines
------------------	-------------------



Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the general safety requirements of rescue operations. The course covers the following issues: safety of emergency rescue operations and elimination of their consequences; types of responsibility for violation of safety requirements; methods of ensuring safe conditions, socio-economic issues of safety of emergency rescue, labor protection of rescuers; analysis and forecasting of risks during emergency rescue operations; formation of practical risk skills and skills safe work; determination of rational ways of the rescuer's actions.

### Purpose of studying of the discipline

Acquisition of theoretical knowledge and practical skills in the organization and safe conduct of emergency rescue operations in emergency situations.

### Learning Outcomes

ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.

ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.

### Learning outcomes by discipline

1) Possess the skills of ensuring safety during the elimination of natural and man-made disasters, principles and requirements for the safe operation of technical equipment.

2) To put into practice safe rescue techniques in areas of forest fires and floods.

3) Provide search and rescue operations in mountainous areas, showing in practice the possession of rescue equipment.

### Prerequisites

Protection against negative factors in the technosphere The reliability of technical systems and risk management The organization and management of rescue in emergency situations

### Postrequisites

Tactics of rescue and elimination of consequences of emergency situations Organization of rescue operations Rescue work carried out in an emergency

## Examination of working conditions on production and the environment

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the issues of the organization of the examination of safety conditions, labor protection at enterprises, as well as their legal foundations. The course covers the following aspects: classification, quantitative assessment of working conditions; occupational injury, occupational diseases; methods of assessing working conditions; expert assessment of working conditions; severity, intensity of the labor process; instrumental assessment of working conditions; hygienic criteria; socio-economic standards; instruction on labor protection, deadlines passing.

### Purpose of studying of the discipline

The purpose of the discipline is to gain knowledge in the field of organizing and conducting state expertise of working conditions at workplaces in organizations of any structure and form of ownership.

### Learning Outcomes

ON5 Apply in practice industrially safe methods and means that exclude the impact of hazardous and harmful production factors and industrial pollution.

ON6 Possess basic knowledge and practical training in the field of technical sciences for the analysis and examination of the activities of the studied objects to safety requirements.

### Learning outcomes by discipline

1) Possess the legal basis for ensuring the safety of rescue operations.

2) Organize emergency rescue operations based on the principles of safety.

3) Describe the condition of the working area of the production environment and safety measures in case of rescue operations in emergency situations.

### Prerequisites

Protection against negative factors in the technosphere The reliability of technical systems and risk management The organization and management of rescue in emergency situations

### Postrequisites

Tactics of rescue and elimination of consequences of emergency situations Organization of rescue operations Rescue work carried out in an emergency

## Fundamentals of chemical, biological and radiation safety

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at the classification of radiation, chemical, biological substances. The following issues are considered: technological processes using harmful chemical, biological substances and their impact on the environment; methods and methods of neutralization of harmful chemical, biological substances; legal aspects of radiation safety, methods of protection against ionizing radiation, methods of radiometric control; tactical and technical characteristics of radiation and chemical reconnaissance devices;

*theoretical foundations of nuclear, chemical, biological and incendiary weapons.*

### **Purpose of studying of the discipline**

*Formation of students` thinking on safety priorities in solving engineering problems, study of the main aspects of ensuring chemical, biological and radiation safety of humans in settlements and work areas*

### **Learning Outcomes**

*ON8 Analyze and regulate the radiation-chemical state of the working area and the environmen.*

### **Learning outcomes by discipline**

- 1) Classify and characterize radiation, chemical and biological pollution of the environment.*
- 2) Analyze technological processes using harmful substances in the technosphere.*
- 3) Analyze technological processes using harmful substances in the technosphere*

### **Prerequisites**

*Recovery, recycling and disposal of consumer waste Disposal, disposal and disposal of industrial waste Recovery technology and recycling of waste production and consumption*

### **Postrequisites**

*Technical regulation of industrial safety*

## **Radiation, chemical and biological protection**

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

*The discipline provides for measures of radiation, chemical and biological protection, the procedure for their implementation. The following issues are covered: theoretical foundations of nuclear, chemical, biological weapons; methods of assessing the chemical state; damaging factors and measures to protect against biological weapons; tactical and technical characteristics of radiation and chemical reconnaissance devices; rules and methods of practical use of individual and collective protective equipment; medical protective equipment; evacuation.*

### **Purpose of studying of the discipline**

*Theoretical and practical training of students on radiation, biological and chemical safety, ensuring safe work with ionizing radiation sources, toxic chemicals, their dosimetry and control.*

### **Learning Outcomes**

*ON8 Analyze and regulate the radiation-chemical state of the working area and the environmen.*

### **Learning outcomes by discipline**

- 1) Explain the danger of using nuclear, chemical, biological weapons.*
- 2) To apply radiation and chemical reconnaissance devices in practice and to assess the state of the environment.*
- 3) Demonstrate skills in the use of medical, individual and collective means of protection.*

### **Prerequisites**

*Recovery, recycling and disposal of consumer waste Disposal, disposal and disposal of industrial waste Recovery technology and recycling of waste production and consumption*

### **Postrequisites**

*Technical regulation of industrial safety*

## **Fundamentals of radiation safety**

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

*The discipline is aimed at considering general ideas about radioactivity, where the following issues are studied: sources of radioactive pollution of the environment; natural radiation background; radiation hazardous objects; radiation safety standards; biological effect of ionizing radiation; methods, devices of radioactive control; protection from ionizing radiation; ensuring radiation safety when handling ionizing radiation sources; burial, processing of radioactive waste; legal aspects of radiation safety*

### **Purpose of studying of the discipline**

*Theoretical and practical training of students on radiation safety, ensuring safe work with ionizing radiation sources, their dosimetry and control. The role of the discipline is to study the basics of ionizing radiation dosimetry, radiation safety and is a necessary element of modern civilization and culture.*

### **Learning Outcomes**

*ON8 Analyze and regulate the radiation-chemical state of the working area and the environmen.*

### **Learning outcomes by discipline**

- 1) Explain the theoretical foundations of radioactivity, the sources of its occurrence, as well as possess the legal aspects of radiation safety.*
- 2) Characterize the biological and ionizing effects of radiation and the operation of radiation monitoring devices.*
- 3) To protect against ionizing radiation, providing radiation safety conditions.*

### **Prerequisites**

*Recovery, recycling and disposal of consumer waste Disposal, disposal and disposal of industrial waste Recovery technology and recycling of waste production and consumption*

### **Postrequisites**

*Technical regulation of industrial safety*

## Material and technical support of first aid

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

### Short description of discipline

*The discipline studies the planning of material and technical support for the provision of first aid, the following issues are considered: tasks of medical support of the population in an emergency situation; medical intelligence; medical protection of personnel of formations, the population conducting rescue operations in the emergency zone; carrying out sanitary and hygienic, anti-epidemic measures; equipping personnel of emergency rescue formations, the population means of medical protection, means of first aid; medical and evacuation measures; sanitary and hygienic and anti-epidemic measures.*

### Purpose of studying of the discipline

*Acquisition by future bachelors of social work of theoretical knowledge and practical skills on the most common signs of emergency situations, first aid and prevention of life-threatening situations and emergency situations.*

### Learning Outcomes

*ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.*

### Learning outcomes by discipline

- 1) Plan logistical support for first aid.*
- 2) Analyze the tasks of medical provision of the population in an emergency situation.*
- 3) Equip the personnel of emergency rescue units and the population with first aid means in the conditions of medical evacuation, sanitary and hygienic and anti-epidemic measures.*

### Prerequisites

*Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations*

### Postrequisites

*Final examination*

## Emergency Medicine

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

### Short description of discipline

*The discipline deals with: fundamentals of disaster medicine, medical and tactical characteristics of a peacetime emergency, damage diagnosis, methods of first aid to victims, fundamentals of epidemiology and hygiene; anatomical and physiological basis of a person; bleeding, fractures; injuries to the skull, eyes, chest, arms, legs; burns - thermal, chemical. frostbite, decrease in body temperature; heat stroke; crushing syndrome, first aid.*

### Purpose of studying of the discipline

*Teaching students the basics of recognition and physiology of the human body, the basics of providing emergency medical care to persons injured in emergency situations of war and peacetime.*

### Learning Outcomes

*ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.*

### Learning outcomes by discipline

- 1) Understand the basics of the anatomical and physiological state of a person.*
- 2) Master the theoretical aspects of disaster medicine and methods of first aid and first aid in emergency situations.*
- 3) Demonstrate the medical and tactical characteristics of a peacetime emergency.*

### Prerequisites

*Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations*

### Postrequisites

*Final examination*

## Organization of first aid in emergency situations

Discipline cycle	Profiling discipline
Course	4
Credits count	6
Knowledge control form	Examination

### Short description of discipline

*The discipline is aimed at measures to eliminate the medical and sanitary consequences of natural disasters, accidents and catastrophes and considers the following issues: organizational structure and tasks of the disaster medicine service, its role and place during rescue operations; structure, equipment and capabilities of medical departments; characteristics and procedure for the use of medical personal protective equipment; organization and scope of first aid medical self-help and mutual assistance at the scene.*

### Purpose of studying of the discipline

*Organization and provision of medical assistance in emergency situations: implementation of professional training of the student to work on providing medical assistance to the population affected by emergency situations on the basis of modern recommendations in the field of civil defense, as well as training of students on theoretical and practical issues of toxicology and medical protection in emergencies, as well as in wartime.*

### Learning Outcomes

*ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.*

### Learning outcomes by discipline

- 1) Organize the provision of first medical self-help and mutual assistance at the scene of the incident.*

- 2) Be able to eliminate the health consequences of natural disasters, accidents and catastrophes.
- 3) Conduct medical reconnaissance, rescue operations, sanitary and hygienic and anti-epidemic measures in the emergency zone.

### **Prerequisites**

Safety rescue Examination of working conditions on production and the environment Security rescue operations in emergency situations

### **Postrequisites**

Final examination

## **Rescue work carried out in an emergency**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline considers questions about rescue and other urgent work in the affected areas and includes the following questions: the departure of rescuers to the place of emergency in the emergency zone; tactical techniques and sequence of rescue operations; exploration, search and rescue operations in the emergency zone; features of rescue operations in an earthquake; features of rescue operations on the railway transportation; elimination of the consequences of emergencies in passenger and cargo transportation.

### **Purpose of studying of the discipline**

Formation of students` system of knowledge and skills for emergency prevention, elimination and minimization of the impact on the population of hazards inherent in any region of emergency situations, as well as skills of using modern technologies of emergency response in the course of professional activity.

### **Learning Outcomes**

ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.

### **Learning outcomes by discipline**

- 1) To create conditions for the effective operation of forces and means for the operational conduct of search and rescue operations, providing timely assistance to victims.
- 2) Organize and plan the work performed in emergency situations.
- 3) Assess emergency conditions and determine the scope of rescue operations.

### **Prerequisites**

Rescue equipment and basic machine Logistical and logistical support Methods and means of protection in emergency situations

### **Postrequisites**

Final examination

## **Tactics of rescue and elimination of consequences of emergency situations**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline studies the possibilities of the emergency rescue service for emergency situations and considers the following issues: movement of rescuers, orientation of the terrain; organization of temporary parking; orientation of the emergency zone; search for victims, release from fencing, transportation; search and rescue operations on pipeline transport, in fire conditions; search and rescue operations in the zone of radioactive damage and highly toxic substances; destruction of dangerous structures; search and rescue operations in the conditions of blockages.

### **Purpose of studying of the discipline**

Training of specialists with high professional training, capable of carrying out rescue and other urgent work in emergency zones, which are carried out in order to save people and provide assistance to victims, localize and eliminate the consequences of emergencies and create conditions for subsequent restoration work.

### **Learning Outcomes**

ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.

### **Learning outcomes by discipline**

- 1) Master the methods and tactics of rescue operations and emergency response.
- 2) Coordinate and direct the actions of structures created to protect the population.
- 3) Demonstrate prompt search for victims and providing them with timely first aid.

### **Prerequisites**

Rescue equipment and basic machine Logistical and logistical support Methods and means of protection in emergency situations

### **Postrequisites**

Final examination

## **Organization of rescue operations**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline is aimed at organizing the professional training of rescuers and considers the following issues: the basics of organizing, managing and conducting search and rescue and other urgent work; features of rescue operations in emergency situations; basic technologies for conducting search and rescue operations; methods and methods of rescuing people in damaged and burning buildings

under rubble and on the upper floors; procedure and the technology of opening bulk protective structures and rescuing people.

### **Purpose of studying of the discipline**

Formation of students' knowledge and practical skills in the field of organization of emergency rescue operations in the liquidation of natural and man-made emergencies. The study of the discipline should contribute to the formation of students' foundations of scientific thinking in the field of protecting the population and territories from natural and man-made emergencies, as well as conducting emergency rescue, search and rescue and other urgent work in various emergency situations.

### **Learning Outcomes**

ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.

### **Learning outcomes by discipline**

- 1) Understand the specifics of emergency rescue operations in various emergency situations of natural and man-made nature.
- 2) Possess methods of monitoring compliance with safety standards and regulations, taking into account the changing situation in the conditions of emergency rescue operations.
- 3) Make decisions on the organization and management of emergency rescue operations.

### **Prerequisites**

Rescue equipment and basic machine Logistical and logistical support Methods and means of protection in emergency situations

### **Postrequisites**

Final examination

## **Security engineering systems and networks**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

When studying the discipline, the following issues are considered: engineering systems, technological complexes, networks, equipment that provide industrial enterprises with electric and thermal energy, gas, communication system; water supply of buildings, structures, consumers meeting sanitary, hygienic requirements; issues of water supply, heat supply, gas and electricity supply, ventilation, air purification of residential, public and industrial and other buildings and structures.

### **Purpose of studying of the discipline**

Training of a specialist in obtaining theoretical knowledge on the study of the phenomena of hydraulics and thermodynamics, water supply, sanitation, heat supply, gas and electricity supply, ventilation and air conditioning, as well as sanitary and engineering equipment of various types of civil and industrial buildings.

### **Learning Outcomes**

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### **Learning outcomes by discipline**

- 1) Demonstrate knowledge of the work of engineering systems and networks, technological complexes and equipment providing enterprises with electric and thermal energy, gas and communication systems.
- 2) Understand the water supply system of buildings and structures that meets sanitary and hygienic requirements.
- 3) Explain the issues of water supply, heat supply, gas and electricity supply, ventilation, air purification of residential, public and industrial and other buildings.

### **Prerequisites**

Safety engineering and technology Safety of technological processes and equipment Ergonomics of production processes

### **Postrequisites**

Final examination

## **Process safety**

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### **Short description of discipline**

The discipline is aimed at studying the main regulatory and legislative acts on ensuring the safety of production processes. The following issues are considered: dangerous and harmful production factors; the concept of risk, principles, methods and means of ensuring safety; hazardous areas of technological equipment and means of protection; general safety requirements for technological equipment and production processes; labor safety during automation and mechanization of production; safety requirements for automated, mechanized flows and departments.

### **Purpose of studying of the discipline**

To form a clear understanding of the sources of a specific danger among students, as well as a stable knowledge of methods and means of minimizing it, as well as to form knowledge among specialists about the inseparable unity of effective professional activity with the requirements for human safety and security.

### **Learning Outcomes**

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### **Learning outcomes by discipline**

- 1) Demonstrate knowledge of regulatory and legislative acts to ensure the safety of production processes.
- 2) Classify and characterize dangerous and harmful production factors.
- 3) Possess methods and means of ensuring the safety of hazardous areas of technological equipment.

### **Prerequisites**

Safety engineering and technology Safety of technological processes and equipment Ergonomics of production processes

### **Postrequisites**

Final examination

## Foundations of PA management and safety systems of Hermetic

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline studies the state regulation of labor protection, the duties of the employer, the internal motivation of employees to work safely. The course includes the following issues: the consequences of the negative impact of working conditions on a person; guarantees of the right of workers to labor protection; organization of the occupational safety management system; development of instructions, organization of training; provision of workers with personal protective equipment; fundamentals of occupational morbidity prevention; documentation, reporting, certification.

### Purpose of studying of the discipline

Formation of students' professional culture of occupational safety at work, readiness and ability to use acquired knowledge and skills to ensure occupational safety in the field of professional activity

### Learning Outcomes

ON7 Assess the impact of engineering and technical complexes and technological equipment on safety conditions.

### Learning outcomes by discipline

- 1) Explain the issues of state regulation of labor protection, employer responsibilities and motivation of employees to safe working conditions.
- 2) Understand the consequences of the negative impact of working conditions on a person, guarantees of workers' rights to labor protection.
- 3) Organize a labor protection management system and develop instructions, provide employees with protective equipment.

### Prerequisites

Safety engineering and technology Safety of technological processes and equipment Ergonomics of production processes

### Postrequisites

Final examination

## Examination of fire and explosion hazard of production

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline evaluates the probability of the impact of fire, explosive factors on production personnel, the population and considers the following issues: fire and explosion prevention system; examination of fire and explosion hazard of industrial, civil facilities; assessment of fire hazard of production, fire resistance of buildings, structures; fire safety measures of facilities, assessment of fire, explosion hazard of production; fire-resistant properties of building structures; measures to determine the scale of fire; conducting rescue operations in case of fire.

### Purpose of studying of the discipline

The purpose of studying this discipline is the formation of students' fundamental knowledge on the prevention of fires and explosions at industrial and civil facilities, the formation of students' system of knowledge, skills and abilities on the use of primary fire extinguishing means, the study of modern fire extinguishing means, fire protection.

### Learning Outcomes

ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.

### Learning outcomes by discipline

- 1) To assess the probability of the impact of fire and explosive factors on production personnel and the population.
- 2) To consider the issues of the fire and explosion prevention system and the examination of the fire and explosion hazard of industrial and civil facilities.
- 3) To analyze the state of fire hazard of production, the degree of fire resistance of buildings and structures and develops fire safety measures of the facility.

### Prerequisites

Theory of combustion and explosion Fire safety Basis of Biochemistry

### Postrequisites

Final examination

## Fire safety industry

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline determines the fire, explosion hazard of flammable liquids, solids, dust and considers the following issues: assessment of the fire and explosion hazard of production; fire-resistant properties of building structures; measures to determine the scale of fire; fire barriers; fire protection of building structures; restriction of the spread of fire between buildings; protection of buildings from the spread of smoke; protection of stairwells from smoke; ensuring the safety of people when the fire.

### Purpose of studying of the discipline

Formation of skills for fire hazard analysis and development of fire protection measures for modern technological processes and productions; formation of a system of knowledge about the state in which the possibility of a fire during technological processes is excluded with established probability.

## Learning Outcomes

ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.

### Learning outcomes by discipline

- 1) Evaluate the fire and explosion hazard of production and fire resistance of building structures.
- 2) Determine the scale of the fire, the conditions for the spread of fire between buildings.
- 3) To ensure the safety of people in case of fire, protecting buildings from the spread of smoke.

### Prerequisites

Theory of combustion and explosion Fire safety Basis of Biochemistry

### Postrequisites

Final examination

## Porownywanina industrial and civil objects

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at studying the basic concepts, terms, conditions of fires of industrial and civil facilities, causes of possible explosions, assessment of the probability of fire, explosion hazard. The course covers: the flammable properties of substances, types of gorenje, fire-explosive connections, characteristics of rescue operations in case of fire, patterns and indicators of fire extinguishing, dangerous factors of the fire extinguishing process, safety measures, assessment of fire hazard of production, fire resistance of buildings, structures.

### Purpose of studying of the discipline

To familiarize with a scientifically based system of knowledge of fire and explosion prevention, with situations of rapid termination and extinguishing of fires that have occurred, with legal, organizational, sanitary and technical measures to prevent fires and protect people, property of the enterprise, inventory, poultry and livestock from fire hazards. To inform students that the methods of solving the voiced tasks are certainly related to the issues of the structural features of the building and the proper use of the internal volume, technological features, properties of materials used in production.

### Learning Outcomes

ON9 To carry out technical and safe work to create conditions for the safety of life and protection in emergency situations.

### Learning outcomes by discipline

- 1) Develop and compile technical documentation, projects, programs, plans of enterprises and organizations on fire and explosion protection of industrial and civil facilities.
- 2) Determine the compliance of general plans of objects with fire safety requirements.
- 3) Carry out calculations of the size of the paths and the time of evacuation of people from the building.

### Prerequisites

Theory of combustion and explosion Fire safety Basis of Biochemistry

### Postrequisites

Final examination

## Doxologia

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline is aimed at studying the evolution of hazards, the principles of the emergence of the science of "Noxology". Basic definitions of terms, axioms of noxology. Criteria of comfort, danger. Studies the concept of risk, the concept of acceptable risk. Classification and assessment of the hazards of an object in the habitat containing combustible and explosive, toxic substances, sources of ionizing radiation, as well as man-made permanent locally active hazards. Chemical, biological weapons.

### Purpose of studying of the discipline

Familiarization of students with the theory and practice of the science of hazards, the study of the origin and cumulative effect of hazards, the principles of their minimization and the basics of protection against them.

### Learning Outcomes

ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.

ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.

### Learning outcomes by discipline

- 1) Demonstrate knowledge of the theoretical foundations of the world of dangers.
- 2) Master the techniques of safe human interaction with the environment, systematizing methods of protection in an emergency situation.
- 3) Predict the possible development of emergencies, plan and implement measures to eliminate the negative consequences of exposure to dangerous and harmful factors.

### Prerequisites

Introduction to the profession

### Postrequisites

Protection against negative factors in the technosphere The reliability of technical systems and risk management The organization and management of rescue in emergency situations

## Basics of protection from the dangers

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The discipline focuses on the basics of facility safety, hazardous areas and the achievement of technosphere safety. During the training, the following issues are considered: means of collective protection; protection of urbanized territories, natural zones from the effects of the technosphere; protection of the earth, soil from pollution; protection from energy flows, radioactive waste; protection from man-made emergencies, threats; declaration of industrial safety; ways to reduce risks; techniques, tactics of protecting people from threats in technosphere.

### Purpose of studying of the discipline

The purpose of the discipline is to introduce students to the basics of safe human interaction with the environment (industrial, household, urban) and the basics of protection from negative factors in dangerous and especially dangerous situations.

### Learning Outcomes

ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.

ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.

### Learning outcomes by discipline

1) Identify hazards of natural and man-made origin for human life.

2) Apply methods to protect production personnel and the public from possible consequences of accidents, catastrophes, natural disasters.

3) Use protective equipment against the adverse effects of emergencies.

### Prerequisites

Introduction to the profession

### Postrequisites

Protection against negative factors in the technosphere The reliability of technical systems and risk management The organization and management of rescue in emergency situations

## The modern world of dangers

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

### Short description of discipline

The course examines the evolution of hazards, harmful substances, vibration, acoustic noise, infrasound, ultrasound, laser, ionizing radiation. During the course, the following issues will be considered: regional, global threats; atmospheric emissions, photochemical smoke, acid precipitation, greenhouse effect; depletion of the ozone layer; impact on the hydrosphere, lithosphere; electric current; mechanical injury; high-pressure systems; transport, radiation, chemical accidents; fundamentals of achievement security of the technosphere.

### Purpose of studying of the discipline

The study of the theoretical foundations of the world of hazards and the principles of safety, readiness to implement this knowledge in the process of life and further professional activity

### Learning Outcomes

ON3 To carry out professionally-oriented activities in the field of life safety and environmental protection.

ON4 To understand the essence and social significance of the profession, to put into practice the knowledge of world science in the field of occupational safety and health.

### Learning outcomes by discipline

1) Explain the evolution of hazards, harmful effects of acoustic noise and vibration, laser and ionizing radiation.

2) To master the regional and global threats of the modern world of dangers.

3) To assess the manifestation of the risk of hazards to achieve the safety of the technosphere.

### Prerequisites

Introduction to the profession

### Postrequisites

Protection against negative factors in the technosphere The reliability of technical systems and risk management The organization and management of rescue in emergency situations

## Externship practice

Discipline cycle	Profiling discipline
Course	4
Credits count	15
Knowledge control form	Total mark on practice

### Short description of discipline

The practice is aimed at studying the following issues: the nature of the activity of the enterprise-institution; the regulatory framework of the relevant branch of the economy, ensuring safe working conditions; the work of the occupational safety and health service; the organization of occupational safety, safety, possible emergencies; assessment of hazardous production factors and technical systems in an emergency conclusions and recommendations on the state of conditions safety of the facility in accordance with regulatory sanitary, organizational, technical and ergonomic requirements.

### Purpose of studying of the discipline

The purpose of the pre-graduate practice is to complete the writing of the thesis (project) work



## Learning Outcomes

ON10 Apply in practice the knowledge of the basics of conducting production processes from the possible consequences of emergencies, accidents and catastrophes.

ON11 Analyze, evaluate and make decisions on the problems of the current state of life safety, based on the achievements of science and practice of domestic and foreign experience

## Learning outcomes by discipline

1) To characterize the safe operating conditions of the enterprise-institution on the basis of the regulatory framework.

2) Assess hazardous production factors and technical systems in an emergency situation.

3) Draw conclusions about the state of the facility's safety conditions and develop recommendations in accordance with the requirements.

## Prerequisites

Production practice III

## Postrequisites

Final examination

## Production practice III

Discipline cycle	Profiling discipline
Course	4
Credits count	15
Knowledge control form	Total mark on practice

## Short description of discipline

During the internship, the following issues are studied: fire service; organizational structure and features of the functioning of the system; forces, means of the fire service; alarm, communication; actions of the services of the personnel on duty; fire investigation; description of the fire; actions of units and subdivisions of the fire service; determination of the tactics of the capabilities of units on the main fire engines; the basics of calculating forces, means, necessary for extinguishing the fire; organization of medical support in emergency situations.

## Purpose of studying of the discipline

Consolidation of professional competencies and acquisition of practical skills and professional experience during the period of familiarization with production technology and organization of work of security services in emergency situations, safety of production processes and environmental safety at industrial enterprises.

## Learning Outcomes

ON10 Apply in practice the knowledge of the basics of conducting production processes from the possible consequences of emergencies, accidents and catastrophes.

ON11 Analyze, evaluate and make decisions on the problems of the current state of life safety, based on the achievements of science and practice of domestic and foreign experience

## Learning outcomes by discipline

1) Explain the functioning of fire service systems and facilities, alarm systems and communications.

2) Conduct fire expertise, describe the actions of units and divisions of the fire service.

3) Calculate the forces and means to extinguish the fire and determine the tactics of the units.

## Prerequisites

Manufacturing Practice II

## Postrequisites

Final examination