МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ ЕКОНОМІЧНИЙ УНІВЕРСИТЕТ
ІМЕНІ СЕМЕНА КУЗНЕЦЯ

ЗАТВЕРДЖЕНО
на засіданні кафедри
здорового способу життя, технологій
і безпеки життєдіяльності
Протокол №6 від 23.01.2026 р.

ПОГОДЖЕНО
Проректор з навчально-методичної роботи

_____ Каріна НЕМАШКАЛО

БЕЗПЕКА ЖИТТЄДІЯЛЬНОСТІ ТА ОХОРОНА ПРАЦІ

робоча програма тренінг-курсу

Галузь знань	**всі**
Спеціальність	**всі**
Освітній рівень	**перший (бакалаврський)**
Освітня програма	**всі**

Статус дисципліни	**обов'язкова**
Мова викладання, навчання та оцінювання	**англійська**

Розробники:
к.т.н., доцент. _____ Ольга ПРОТАСЕНКО
к.т.н., доцент _____ Євгенія МИХАЙЛОВА

Завідувач кафедри
здорового способу життя,
технологій і безпеки
життєдіяльності _____ Андрій ІВАШУРА

Харків
2026

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SIMON KUZNETS KHARKIV NATIONAL UNIVERSITY OF ECONOMICS

APPROVED
at the meeting of the department
healthy lifestyle, technologies
and life safety
Protocol № 6 of 23.01.2026

AGREED
Vice-rector for educational and methodical work

_____ Karina NEMASHKALO

LIFE SAFETY AND OCCUPATIONAL HEALTH

Program of the course

Field of knowledge	**All**
Specialty	**All**
Study cycle	**first (bachelor)**
Study programme	**All**

Course status	**mandatory**
Language	**English**

Developers:
PhD (Engineering),
Associate Professor _____ Olha PROTASENKO
PhD (Engineering),
Associate Professor _____ Evgeniia MYKHAILOVA

Head of Healthy Lifestyle,
Technologies and Life Safety
Department _____ Andrii IVASHURA

Kharkiv
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INTRODUCTION

The downside of scientific, technical, social, and economic progress is an increased risk of hazardous occurrences and their negative impact on human life and the environment. Consequently, improving safety is one of the most urgent priorities today. While creating absolute security is impossible, minimising the likelihood of danger is feasible, albeit challenging. It requires a radical shift in the human worldview, necessitating the rethinking and re-evaluation of modern scientific experience and knowledge. New disciplines have emerged to achieve this goal, combining diverse historical and contemporary human experiences. One example of such an interdisciplinary approach is the training course "Life Safety and Occupational Health".

The course is based on the analysis and resolution of human safety issues. Its content comprises a comprehensive study and classification of hazards affecting humans, their sources, and measures to prevent and eliminate them. The scientific foundation of the course draws upon modern research in physiology, psychology, ergonomics, and ecology, providing students with systematic knowledge.

The purpose of the course is to study the general patterns of the occurrence and development of dangers, analyse the nature and consequences of hazards on human health, and develop the necessary skills and abilities to prevent and eliminate risks.

The objectives of the course are:

identification of optimal parameters of human activity;

study of the conditions of hazard formation;

forecasting the occurrence of danger;

determination of methods for preventing and reducing the negative consequences of hazards on people.

The object of the training course is human vital activity.

The subject is human life activity.

COURSE CONTENT

Content module 1. Life safety and occupational health

Topic: Basic concepts of life safety and occupational health.

1.1. Aim, object and subject of the training course.

The aim, object and subject of the training course. Training course content and structure. Connection of training course with other disciplines. Basic concepts – life, activity, environment, safety, hazard, danger, occupational safety etc. Safety of human, society and nation. Safety culture is an element of culture, which realises the protective function of humanity.

1.2. Taxonomy, identification, and quantification of hazards.

Conceptual framework and taxonomy. Identification methods: retrospective, prospective, and special methods. Sources of information (Safety Data Sheets (SDS), equipment technical documentation, regulatory and legal acts). The essence of

quantification: the transition from qualitative hazard characteristics to quantitative ones.

1.3. Hazard classifications.

Hazard classification based on the consequences of the impact of harmful factors on the human body, by the nature of their origin, by the nature of the effect on the human body, by **localisation**, by the time of manifestation of negative consequences, by the damage caused, and others.

1.4. Classification of emergencies.

Classification of emergencies (ES) based on the nature of the origin of events that may trigger an ES within the territory of Ukraine. Classification of ES based on the scale of consequences caused, the number of casualties and fatalities, and the volume of technical and material resources required to eliminate their consequences.

Topic 2: Chemical, biological, physical, and psychophysiological hazards. Safety management.

2.1. Chemical hazards and safe handling of chemical substances.

Types of hazardous chemical substances. The physical state (state of aggregation) of a chemical substance and its influence on the hazard level. The impact of chemical hazards on the human body. Routes of entry of chemical substances into the body. Chemical hazard communication system: rules for labelling chemical products (hazard signs, GHS pictograms). Protection and prevention measures: collective protection measures, personal protective equipment (PPE). Actions in case of emergencies.

2.2. Chemical safety management.

Legislative regulation and standards (Ukraine and the EU): the Law of Ukraine "On Ensuring Chemical Safety and Management of Chemical Products" (current framework), the Technical Regulation on Hazard Classification, Labelling and Packaging, and the requirements of the international GHS system. Methods of chemical hazard risk control (engineering, administrative, etc.). Chemical risk assessment at the workplace. Safe storage and compatibility: warehouse storage rules, compatibility matrix.

2.3. Biological hazards and fundamentals of biosafety.

The nature and classification of biological hazards: microbiological agents and their metabolic products, macrobiological threats. Routes of transmission and mechanisms of the impact of biological hazards. Consequences of exposure to biological hazards on the human body: acute infectious diseases, allergic reactions, toxic poisoning, dysbiosis. Organisation of biosafety at the workplace: general measures, personal protective equipment (PPE) against biological hazards. Procedure for action in the event of a biological accident.

2.4. Biosafety management.

Regulatory framework and management standards: International Standard ISO 35001, "Biorisk management for laboratories and other related organisations"; the WHO Laboratory Biosafety Manual; and Ukrainian legislation on the protection of the

population from infectious diseases and on sanitary and epidemic well-being. Control measures and protection barriers against biological hazards. Biological risk assessment (Biorisk assessment).

2.5. Physical hazards of the occupational and domestic environment.

Microclimate parameters. The impact of abnormal microclimate parameters on humans. Regulation of microclimate parameters: optimal and permissible microclimate parameters. Protection of human health under conditions of exposure to abnormal microclimate parameters. Vibroacoustic factors (noise, ultrasound, infrasound). The impact of noise on human health: specific effects (occupational hearing loss) and non-specific effects (impact on the nervous and cardiovascular systems, stress). Types of vibration: general (whole-body) and local (hand-arm). Vibration disease: general and local. Protection against vibroacoustic factors. Electromagnetic fields and radiation: nature of origin, classification by ranges. The impact of electromagnetic fields and radiation on human health. Protection against electromagnetic fields and radiation. The effect of insufficient and excessive lighting on human health and protection methods. Air dustiness and gas contamination: causes, effects on humans, and protective measures.

2.6. Management system for protection against physical hazards.

Legislative and regulatory framework for regulating physical factors: general legislation of Ukraine, sanitary and hygienic regulations for noise, vibration, EMF, microclimate, hygienic classification of labour, and technical rules. Monitoring and attestation of workplaces: workplace attestation based on working conditions, laboratory control. Organisation of health surveillance of workers: medical supervision, occupational risk management. Work and rest regimes: regulation of shift duration, regulated breaks, and admission to work. Supervision and liability: state supervision and public control, liability of officials for violation of standards.

2.7. Psychophysiological hazards.

Classification of psychophysiological hazards: labour severity (load on the musculoskeletal system and functional systems (cardiovascular, respiratory)), and labour intensity. Physical overload: dynamic work, static load, working posture. Neuro-psychic overload: intellectual loads, sensory loads, emotional loads, and work monotony. Consequences of impact on the human body: fatigue and overfatigue (exhaustion), workplace stress, professional burnout, psychosomatic disorders, and musculoskeletal disorders (MSDs).

2.8. Psychophysiological safety management.

Work and rest regimes: micropauses, lunch breaks, gymnastics (physical exercise breaks), psychological relief rooms. Alternation of activities: staff rotation to prevent monotony. Legislative regulation: hygienic classification of labour by indicators of severity and intensity, limit norms for lifting and moving heavy loads, and medical control: examinations by a neurologist, ophthalmologist, and surgeon for risk groups.

Topic 3: Legal and organisational bases of life safety and occupational health.

3.1. The current life safety and occupational health conditions in Ukraine and abroad.

Analysis of life safety and occupational health in Ukraine and abroad. International and Ukrainian life safety and occupational health programs: implementation and results.

3.2. A life safety legislation in Ukraine.

The legislative and regulatory documents of Ukraine on life safety. Their brief description.

3.3. Structural-functional scheme of state management of life safety.

General legislative norms and subordinate acts, standards, and technical specifications, as well as technical and administrative regulations that determine the principles and mechanisms of life safety regulation. Monitoring – the primary form of control over the functioning of the life safety system. The work of the central state and local executive authorities regarding the ensuring of human life safety.

3.4. Legislation of Ukraine on occupational safety.

Constitutional principles of occupational safety in Ukraine. Law of Ukraine "On Occupational Safety". Principles of Ukrainian state policy on occupational safety. Guarantees of workers' rights to occupational safety, benefits, and compensation for arduous and hazardous working conditions. Occupational safety for women, minors, and persons with disabilities. Regulatory and legal acts on occupational safety: definition, structure, and register. Responsibilities of employees for compliance with occupational safety regulations. National standards of Ukraine on occupational safety. Sanitary regulations, building codes, and other documents on occupational safety.

3.5. Occupational safety financing.

Basic principles and sources of financing. Inclusion of costs for the implementation and acquisition of occupational safety measures in gross expenditures.

3.6. The occupational safety management system in Ukraine.

Competence and powers of occupational safety management bodies. The National Council for Life Safety of the Population. State supervisory bodies for occupational safety and their rights. Public control over compliance with occupational safety legislation.

3.7. Structure, functions, and tasks of occupational safety management in the organisation.

The enterprise occupational safety service. Status and reporting lines (subordination). Tasks and functions of the occupational safety service. Structure and staffing (number of employees) of occupational safety services. Rights and responsibilities of occupational safety officers.

3.8. Liability of officials and employees for violations of life safety and occupational health legislation.

Topic 4: Physiological and psychological criteria of human safety.

4.1. Physiological systems of the human body.

Subsystems and systems of the body. Their characteristics and role in the body. The protective properties (defence mechanisms) of the body.

4.2. Characteristics of sensory analysers.

The role of analysers in the body. Absolute and differential thresholds of sensation. The Weber-Fechner law. Classification of analysers.

4.3. Reflexes and the reflex arc.

The significance of reflexes. Conditioned and unconditioned reflexes, features of their functioning.

4.4. Human health as a necessary condition for safety.

Valeology as the science of human health. Characteristics of individual and social health. Basic mechanisms for maintaining human health. Factors affecting human health.

4.5. Mental processes and properties.

The psyche. Mental processes: thinking, memory, attention, etc. Mental properties: temperament, character, abilities, will, etc. The role of mental processes and properties in human safety. Psychological reliability of the individual; its role in ensuring safety.

4.6. Classification and characteristics of functional states.

The concept of the "functional state of the body"; classification of states. Analysis of the most common adverse states: fatigue, stress, monotony. Their impact on human safety. Methods for preventing and managing adverse functional states.

Topic 5: Physiology and occupational health.

5.1. The technogenic environment and technogenic hazards.

Characteristics of the technogenic environment. Classification of dangerous technogenic factors.

5.2. Air in the working area.

Microclimate of the working area. Regulation and control of microclimate parameters. Methods for normalising microclimate parameters. Air quality control. Methods for preventing air pollution in the working area. Organisation of indoor air exchange; air balance. Natural ventilation and its types. Mechanical (artificial) ventilation systems: their selection and design.

5.3. Indoor lighting.

Natural, artificial, and combined lighting. Primary requirements for indoor lighting. Regulation of lighting standards. Classification of artificial light sources.

5.4. Vibration.

Classification of vibration. Hygienic regulation of vibration. Methods for controlling vibration parameters. Collective and personal protective equipment.

5.5. Noise.

Classification of noise. Regulation of noise levels. Noise control. Means of collective and personal protection against noise. Sources and parameters of infrasound

and ultrasound. Regulation and control of infrasound and ultrasound. Protection against ultrasound and infrasound.

5.6. Electromagnetic fields and radiation.

Classification of electromagnetic fields and radio-frequency radiation. Regulation of electromagnetic fields and radio-frequency radiation. Methods for controlling electromagnetic fields and radio-frequency radiation. Protection against electromagnetic fields and radio-frequency radiation. Classification of optical radiation. Characteristics of infrared, visible, and ultraviolet radiation; their regulation and control methods. Protection against infrared, visible, and ultraviolet radiation. Sources of ionising radiation, classification, and features of their use. Protection against ionising radiation.

5.7. Electric current.

Electrical injuries. Factors influencing the consequences of electric shock. Classification of premises according to the degree of electrical hazard. Conditions for electric shock. Safe operation of electrical installations: electrical protective equipment and measures.

5.8. Adverse impact of technogenic hazards on humans.

Assessment of factors affecting humans: microclimate, lighting, noise, vibration, electromagnetic fields, and radiation.

5.9. Requirements for the planning and layout of work premises.

Hazard classification of enterprises according to sanitary standards. Energy and water supply, sewerage, and transport communications at the enterprise, organisation, or institution. Occupational health requirements for the layout of office equipment and workplace organisation.

5.10. Fire safety.

Categorisation of premises based on explosion and fire risk. Classification of explosive and fire-hazardous zones. Fire alarm systems and their types. Fire extinguishers and their classification. Fire safety training for employees.

Topic 6: Workplace safety.

6.1. Industrial injuries, occupational diseases, and industrial accidents.

6.2. Prevention of injuries and occupational diseases.

6.3. Principles of safe workplace organisation.

Ergonomics: the science of creating safe working conditions. The concept of the workplace. Assessment of workplace organisation. Work and rest regimes (schedules). Adverse consequences of improper work and rest regimes for workers.

6.4. Methods for improving worker safety.

Occupational selection and career guidance as means of ensuring worker safety. Types of occupational selection: medical, social, educational, and psychophysiological. Personnel assessment.

Topic 7: Natural hazards and their impact on humans.

7.1. Characteristics of the natural environment.

Characteristics of the natural environment. Ecological characteristics of human activity. Classification of hazardous natural factors. Their impact on humans.

7.2. Natural hazards. Classification and adverse impact. The adverse impact of dangerous meteorological phenomena on humans.

The adverse impact of dangerous topographical phenomena on humans. The adverse impact of dangerous tectonic phenomena on humans. The adverse impact of dangerous cosmic phenomena on humans. Characteristics of dangerous pathogenic microorganisms: protozoa, fungi, viruses, rickettsiae, bacteria. Pandemics, epidemics, mass poisonings. Characteristics of diseases (cholera, anthrax, plague, etc.). Infectious diseases of animals and plants.

7.3. Adverse anthropogenic impact on the natural environment.

Anthropogenic hazards. Characteristics. Consequences of their impact on humans and the natural environment.

Topic 8: Social hazards and their impact on humans.

8.1. Characteristics of the social environment. Social hazards.

Characteristics of the social environment. Dangerous social factors. Social factors affecting human health. Harmful habits, social diseases, and their prevention. Alcoholism and drug addiction. Rising crime rates as a risk factor. Concepts and types of crowds. Human behaviour in a crowd. Factors increasing a person's vulnerability to risk.

8.2. Global problems of humanity.

Ecological crisis, resource crisis, peaceful coexistence, environmental protection, energy and raw materials, food security, demographic situation, information security, and eradication of dangerous diseases. Socio-political conflicts and the use of weapons of mass destruction (WMD). Types of terrorism. Classification of facilities requiring protection against terrorist acts. Anti-terrorism criteria for assessing vulnerability and enhancing the resilience of high-risk facilities.

8.3. Information technologies and human safety.

The impact of information factors on human health and public safety.

Topic 9. Risk. Risk analysis. Risk management.

9.1. A systematic approach to life safety and occupational health.

Life safety axioms. The axiom of absolute safety and the axiom of potential danger. Their comparison and role in creating safe living conditions.

9.2. Risk analysis.

Definitions of "risk analysis" and "risk". Classifications of risks based on the scale of distribution, depending on expediency, according to the acceptability degree, and other characteristics. Risk assessment, obtaining quantitative danger characteristics, examples of calculations. The concept of acceptable risk, its meaning for creating safe living conditions in society.

9.3. Risk assessment methods.

Approaches to risk determination. Engineering method: qualitative stage (characteristics of all possible dangers), quantitative stage (selection of the most probable dangers, development of effective measures to eliminate them by building "fault tree"). Model method: construction of models of danger occurrence and development, analysis of possible negative consequences of its realisation for the person. Expert method: professional analysis of danger occurrence risk. Sociological method: conducting a population quiz, statistical data processing, and identifying the most significant dangers.

9.4. Risk management.

Definition of "risk management". Safety management by comparing the costs and benefits of risk reduction. Development of risk strategy to reduce the probability of risk realisation and minimise possible adverse consequences. Choice of methods and tools to manage identified risk.

The list of practical (seminar) / laboratory studies in the training course is given in table 1.

Table 1

List of practical classes

Name of the topic and/or task	Content
Topic 1,2. Task 1	Basic concepts of life safety and occupational health
Topic 3. Task 2	Legal and organisational bases of life safety and occupational health
Topic 4. Task 3	Health and health maintenance mechanisms
Topic 4. Task 4	Organism's energy homeostasis types
Topic 4. Task 5	Mental processes and properties
Topic 4. Task 6	Fatigue and stress
Topic 5. Task 7	Physiology and occupational health
Topic 6. Task 8	Workplace safety
Topic 6. Task 9	Professional consultation and selection. Human resources
Topic 7. Task 10	Natural dangers and their impact on humans
Topic 8. Task 11	Social dangers and their impact on humans
Topic 9. Task 12	Risk analysis. Risk assessment. Risk management

The list of self-studies in the training course is given in table 2.

Table 2

List of self-studies

Name of the topic and/or task	Content
Topic 1-9	Search, selection and review of literature on a given topic
Topic 1-9	Preparation for practical classes
Topic 1-9	Preparation for the tests

The number of hours practical studies and hours of self-study is given in the technological card of the training course.

TEACHING METHODS

During teaching a training course to get specific learning outcomes and activate the educational process, it is used following learning methods:

Visual (presentations (Theme 1-9)).

Practical (discussions (Theme 1,5,6,8)), work in small groups (Theme 2-4,7,9)).

ESTIMATING FORMS AND METHODS

The university uses a 100-point accumulative system of student learning outcomes estimation.

Current control is carried out during practices. Its purpose is to check the level of students' preparedness for specific work tasks. Current control is evaluated depending on the scored points: the maximum number of points is 100; the minimum is 60.

The final control includes the semester control and assessment of the student.

Semester control is a credit.

The final grade on the training course is the sum of points received for current control.

During the teaching of the training course, the following control measures are used:

Current control: competence-oriented task (60 points), tests (40 points).

Semester control: a credit.

More detailed information on the assessment system is provided in technological card of the course

RECOMMENDED LITERATURE

Main

1. Серіков Я. Основи охорони праці / Я. Серіков, Батир Халмурадов, Вадім Сінгаєвський, К. Сєрікова. – Київ : Центр навчальної літератури, 2024. – 250 с.

2. Желібо Є.П. Основи охорони праці : підр. / Є. П. Желібо, М. П. Гандзюк, М. О. Халімовський. – Київ : Каравела, 2023. – 384 с.

3. Запорожець О. Основи охорони праці / О. Запорожець, О. Протоєрейський, Г. Франчук, І. Боровик. Київ : Центр навчальної літератури, 2021. – 264 с.

4. Івах Р. Основи охорони праці : навч. посіб. / Р. Івах, Я. Бедрій, Б. Білінський, М. Козяр. – Київ : Кондор, 2025. – 464 с.

5. Ivashura A. Green infrastructure as a component of sustainable development / A. Ivashura, O. Protasenko // Proceedings book. – Editura Universitară Danubius, 2023. – P. 58-68, https://repository.hneu.edu.ua/handle/123456789/29022.

6. Mykhailova E. Ergonomic thinking in the design of human-machine systems / E. Mykhailova, G. Mygal, O. Protasenko, N. Kobrina // Bulletin of the National Technical University “KhPI”. Series: New solutions in modern technology. – Kharkiv: NTU “KhPI”, 2023, no. 1(15), pp. 42–52, https://repository.hneu.edu.ua/handle/123456789/29478.

7. Михайлова Є. О. Аналіз хімічних небезпек і попередження їхнього впливу на працівників поліграфічного виробництва / Є. О. Михайлова, О. Ф. Протасенко, М. О. Мороз, Д. М. Дейнека // Комунальне господарство міст. – 2025. – Т. 1. – Вип. 189. – С. 404–409, https://repository.hneu.edu.ua/handle/123456789/35916.

Additional

8. Грибан В. Охорона праці / В. Грибан, О. Негодченко. – Київ : Центр навчальної літератури, 2021. – 280 с.

9. Катренко Л. А. Охорона праці : навч. посіб. / Л. А. Катренко, Ю. В. Кіт, І. П. Пістун. – Київ : Університетська книга, 2023. – 540 с.

10. Illiashenko O., Mygal V., Mygal G., Protasenko O. A convergent approach to the viability of the dynamical systems: The cognitive value of complexity. International Journal of Safety and Security Engineering, 2021, Vol. 11, no. 6, pp. 713–719, https://repository.hneu.edu.ua/handle/123456789/27364.

11. Protasenko O. Ergonomics 4.0: digitalization problems and overcoming them / O. Protasenko, G. Mygal // Municipal economy of cities. – Kharkiv : KhNUMG im. O.M. Beketova. – 2023. – Vol. 3. – № 177. – P. 182–188. https://repository.hneu.edu.ua/handle/123456789/29551.

Information resources

12. Тренінг-курс “Безпека життєдіяльності та охорона праці” (усі спеціальності) [Електрон. ресурс] : Сайт ПНС ХНЕУ ім. С. Кузнеця. – Режим доступу : https://pns.hneu.edu.ua/course/view.php?id=9915.

13. Безпека життєдіяльності та охорона праці. Практикум з тренінг-курсу для здобувачів вищої освіти всіх спеціальностей першого (бакалаврського) рівня [Електронний ресурс] / уклад. Є. О. Михайлова, О. Ф. Протасенко. – Харків : ХНЕУ ім. С. Кузнеця, 2024. – 146 с. – Режим доступу : http://repository.hneu.edu.ua/handle/123456789/32520.

14. Безпека життєдіяльності та охорона праці. Практикум із тренінг-курсу для здобувачів вищої освіти спеціальності 061 «Журналістика» першого (бакалаврського) рівня [Електронний ресурс] / уклад. Є. О. Михайлова, О. Ф. Протасенко. – Харків : ХНЕУ ім. С. Кузнеця, 2025. – 186 с. – Режим доступу : http://repository.hneu.edu.ua/handle/123456789/35798.