



# Syllabus

## Course Program



### Risk management using equipment and technologies

**Specialty**

263 - Civil Security

**Institute**

Institute of Education and Science of Mechanical Engineering and Transport

**Educational program**

Occupational safety and health

**Department**

Occupational and Environment Safety (144)

**Level of education**

Master's level

**Course type**

Profiled discipline package 01 "Labor protection"

**Semester**

2

**Language of instruction**

English, Ukrainian

### Lecturers and course developers

**First name and surname**

Viacheslav BEREZUTSKYI

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Doctor of Technical Sciences, professor of the Department of Occupational and Environmental Safety of KhPI National Technical University. 36 years of teaching experience in higher education institutions. Works at the National Technical University "Kharkiv Polytechnic Institute" - 43 years. Has more than 370 publications. Participated in the publication of 8 monographs (7 foreign and one cited in Scopus). He developed and printed 8 textbooks and training manuals with the seal of NTU "KhPI" in co-authorship, Prepared 6 Ph.D. and 5 masters. Learn more about the teacher on the department's website - <http://sites.kpi.kharkov.ua/SafetyOfLiving/>

General information, number of publications, main courses, etc.

[More about the lecturer on the department's website](http://sites.kpi.kharkov.ua/SafetyOfLiving/)

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# General information

## Summary

The course covers issues related to the application of risk management in the use of equipment and technologies in labor protection in the theoretical and practical activities of specialists in the direction of master's training in the specialty 263 - civil safety, educational program - Labor protection. The following issues are considered in the course: production risks; assessment of risks in the organization; professional risk; risk management; risk assessment methods; the ISO 12100:2016 standard and its connection with professional training; indicators of danger, etc.

## Course objectives and goals

The formation of the personality of a specialist capable of solving complex non-standard tasks and problems in the field of civil security management, capable of practical activities, possessing the appropriate competencies necessary for the identification and assessment of potential sources of hazards of various nature during the operation of economic facilities.

## Format of classes

Lectures, practice works, consultations, self-study. Final control in the form of an exam from the discipline.

## Competencies

CC-1. The ability to search, process and analyze information from various sources.

CC-3. The ability to make informed decisions.

CC-6. The ability to abstract thinking, analysis and synthesis.

SC-2. The ability to preventive and operative (emergency) planning, management of safety measures of professional activity.

SC-3. The ability to carry out technical and economic analysis, risk assessment, comprehensive justification of projects, plans, decisions, their implementation in the field of civil security.

SC-7. The ability to organize and conduct monitoring of identified objects, phenomena and processes, analyze its results and develop scientifically based recommendations based on the received data.

SC-8. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments to specialists and non-specialists.

## Learning outcomes

OL-1. Apply specialized conceptual knowledge, including modern scientific achievements, to solve scientific and applied problems in the field of civil security.

OL-6. Identify and analyze possible threats of an emergency situation, an accident, an accident at work and assess possible consequences and risks.

OL-7. Use modern information and communication technologies, specialized software when solving practical and/or scientific problems.

OL-14. Carry out forecasting, risk assessment during professional activities and the capabilities of the relevant departments in response to emergency situations and events.

OL-17. Search for necessary information in special literature, databases, other sources of information, analyze and objectively evaluate information.

## Student workload

The total volume of the course is 180 hours (6 ECTS credits): lectures - 32 hours, practical works - 32 hours, self-study - 116 hours.

## Course prerequisites

To successfully complete the course, you must have knowledge and practical skills in the following disciplines: "Introduction to the specialty. Introductory practice", "System and mathematical analysis", "Occupational safety management", "System analysis for solving tasks of professional and industrial safety".

## Features of the course, teaching and learning methods, and technologies

Lectures are held interactively with the use of multimedia technologies. Practical classes use a project-based approach to learning, game methods, and focus on the application of information technologies in labor protection. Educational materials. accessible to students through OneNote Class Notebook and a distance course on Moodle: <http://dl.khpi.edu.ua/login/index.php>..

## Program of the course

### Topics of lectures

#### Content module No. 1. RISK ASSESSMENT STRATEGY

**Topic 1. INTRODUCTION.** Industrial risks, risk assessment in the organization, professional risk, risk management, risk assessment methods

**Topic 2. DSTU standard ISO 12100:2016.** General characteristics of the ISO 12100:2010 standard and its relationship with professional training, hazard indicators.

**Topic 3.** General questions regarding the implementation of the DSTU ISO12100 standard. Scope, regulatory references, terms and definitions

**Topic 4. Risk assessment and reduction strategy.** Constructive risk reduction procedures, a schematic presentation of a repeatable 3-step risk reduction method

**Topic 5. Risk assessment.** General provisions, information required on risk assessment, restrictions imposed on the machine, hazard identification, preliminary risk assessment, risk assessment.

**Topic 6. Risk reduction.** General provisions, the "three-step" method, measures to develop a safe design of the machine itself.

**Topic 7. Means of protection and additional protective measures.** General provisions, selection and application of protective fences and protective devices, protective measures to ensure stability, requirements for the design of protective fences and protective devices, protective devices for reducing emissions, additional protective measures.

**Topic 8. Information to users.** General questions about information, location and nature of information about users, signals and warning devices, marking, signs (pictograms), warning signs, accompanying documents (operating manual).

#### Content module No. 2. RISK ASSESSMENT AND REDUCTION

**Topic 9. Documentation on risk assessment and mitigation.** Requirements for OZR documentation, a schematic representation of the machine.

**Topic 10. Risks accompanying the use of machines.** Lathe and screw-cutting versta, general characteristics, dangerous parts and assemblies, instruction on labor protection of the turner.

**Topic 11. Risks when working at height.** Risks when working at height - NPAOP 0.00 - 7.07 -87, requirements for technological processes, requirements for equipment, requirements for the organization of workplaces and performance of work, requirements for the use of PPE, requirements for personnel allowed to work at height, control of compliance with safety requirements , terms and definitions, a list of works performed at height.

**Topic 12. Risks when working with hand tools.** General characteristics of the hand tool ("Occupational safety rules when working with tools and devices", sample instructions for occupational safety when working with a hand tool

**Topic 13. Risks of operating pressure vessels.** Terms. State regulatory act on labor protection DNAOP 0.00-1.07-94\*, construction of vessels, materials, manufacturing, fittings, control and measuring devices. Devices and preventive devices, installation, registration and technical, vessel inspection, operation permit, supervision, maintenance, maintenance and repair. Dishes and semi-finished products purchased abroad. Additional requirements for tanks and barrels for the transportation of liquefied gases. Additional requirements for cylinders. Control over compliance with the requirements of the rules.

**Topic 14. Labor and health risks during the use of chemicals in production.** General description of the risks of using chemicals in production, measures of labor protection and industrial sanitation, general safety regulations, basic rules of work in a chemical laboratory.

**Topic 15. Risks during forging and heat treatment of metals.** Risks of work in forging and press shops, risks of heat treatment of metals.

**Topic 16. Labor risks during metal welding.** General regulations on safety (risks) during welding of metals ("Occupational safety rules during welding of metals"), basic occupational safety requirements, risks during electric welding, requirements for workplaces, requirements for providing employees with personal protective equipment.

## Topics of the workshops

**Practical work 1.** General approaches to determining equipment risks

**Practical work 2.** General approaches to determining the risks of the universal lathe and screw-cutting machine 1K62.

**Practical work 3.** General approaches to determining the risks of milling machines

**Practical work 4.** General approaches to determining the risks of grinding machines 3G71 with a dust collector.

**Practical work 5.** General approaches to determining the risks of a vertical drilling machine 2H135

**Practical work 6.** General approaches to determining the risks of performing work at height

**Practical work 7.** General approaches to determining risks when working with a manual drill.

**Practical work 8.** Risks when working with cylinders.

**Practical work 9.** Risks during work in a chemical laboratory.

**Practical work 10.** Risks during heat treatment of metals

**Practical work 11.** Risks during electric and arc welding of metals

## Topics of the laboratory classes

Laboratory work within the discipline is not provided.

## Self-study

Independent work of students is carried out during preparation for classes, performance of familiarization practice (abstracts).

## Course materials and recommended reading

Basic literature,

1. Berezutsky V.V. Risk management of the use of equipment and technologies: a study guide for students of specialty 263 - Civil safety, educational program - Occupational safety/ V.V. Berezutsky - NTU "KhPI", Kharkiv.: FOP Panov A.M. 2020. - 427 p. URI: <http://repository.kpi.kharkov.ua/handle/KhPI-Press/47595>

2. Methodological instructions for the course work "Analysis of the risks of the use of technologies and equipment" from the course "Risk-management of the use of equipment and technologies" [Electronic resource]: for students of special. 263 "Civil Security", educational program "Labor Protection" / editor: V. V. Berezutskyi, O. I. Ilyinska; National technical University "Kharkiv Polytechnic Institute". - Electron. text. data. - Kharkiv, 2020. - 44 p. - URI:

<http://repository.kpi.kharkov.ua/handle/KhPI-Press/49427>.

3. DSTU EN ISO 12100:2016 Machine safety. General design principles. Risk assessment and risk reduction (EN ISO 12100:2010, IDT; ISO 12100:2010, IDT). URI: [http://online.budstandart.com/ua/catalog/doc-page?id\\_doc=71627](http://online.budstandart.com/ua/catalog/doc-page?id_doc=71627)

#### Additional literature.

4. Risks when working at height - NPAOP 0.00 -7.07 -87 URI: <https://osvita-docs.com/node/350>

5. "Rules of labor protection when working with tools and devices" APPROVED Order of the Ministry of Energy and Coal Industry of Ukraine 19.12.2013 No. 966). URI: <https://zakon.rada.gov.ua/laws/show/z0327-14#Text>

6. On the approval of the Rules of labor protection during the operation of equipment operating under pressure. URI: <https://zakon.rada.gov.ua/laws/show/z0433-18#Text>

7. On the approval of the Rules of labor protection during metal welding. URI: <https://zakon.rada.gov.ua/laws/show/z0063-13#Text>

8. The program, methodological instructions and control tasks from the course "Risk - management of the use of equipment and technologies": for students of special. 263 "Civil security", educational program "Labor protection" forms of education / structure V.V. Berezutskyi; National technical University "Kharkiv Polytechnic Institute". - Kharkiv: NTU "KhPI", 2020. - 28 p. URI: <http://repository.kpi.kharkov.ua/handle/KhPI-Press/46206>

## Assessment and grading

### Criteria for assessment of student performance, and the final score structure

100% of the final grade consists of assessment results in the form of credit (40%), assessment of practical tasks and tests (30%+30%).

Assessment: test (10 questions on theory) and evaluations on practical tasks of introductory practice.

Current assessment: 2 online tests and practical tasks (20% each).

### Grading scale

Total points	National	ECT S
90-100	Excellent	A
82-89	Good	B
75-81	Good	C
64-74	Satisfactory	D
60-63	Satisfactory	E
35-59	Unsatisfactory (requires additional learning)	FX
1-34	Unsatisfactory (requires repetition of the course)	F

## Norms of academic integrity and course policy

The student must adhere to the Code of Ethics of Academic Relations and Integrity of NTU "KhPI": to demonstrate discipline, good manners, kindness, honesty, and responsibility. Conflict situations should be openly discussed in academic groups with a lecturer, and if it is impossible to resolve the conflict, they should be brought to the attention of the Institute's management.

Regulatory and legal documents related to the implementation of the principles of academic integrity at NTU "KhPI" are available on the website:

<http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/>

### Approval

Approved by

Date, signature  
протокол № 2  
20.09.2023



Head of the department  
Sergij VAMBOL

Date, signature  
20.09.2023



Guarantor of the educational  
program  
Viacheslav BEREZUTSKYI