



# OCCUPATIONAL AND CIVIL SAFETY

## Working program of the academic discipline (Syllabus)

### Requisites of the discipline

Level of high education	<i>First cycle of higher education (bachelor degree)</i>
Branch of knowledge	<i>17 Electronics and Telecommunications</i>
Specialty	<i>171 Electronics</i>
Educational program	<i>Electronic Components and Systems</i>
Status of the discipline	<i>Normative</i>
Learning form	<i>Full-time (day-time)</i>
Semester	<i>Fourth year, seventh semester</i>
Course scope	<i>1 ECTS credits / 120 hours</i>
Semester control / control measures	<i>Test, Modular Control Work</i>
Schedule	<i><a href="https://schedule.kpi.ua/lecturers?lecturerId=9a4e5e1d-07c5-454e-853e-1ce693bf5448">https://schedule.kpi.ua/lecturers?lecturerId=9a4e5e1d-07c5-454e-853e-1ce693bf5448</a></i>
Language	<i>English</i>
Information about course supervisor and lecturers	<i>Oksana Ilchuk, PhD, e-mail – oksana_i@i.ua, Phone – 097-856-37-10</i>
Course placement	<i>Course page on Moodle:</i>

### Curriculum of the discipline

#### 1. Description of the discipline, its purpose, subject of study and learning outcomes

*The discipline belongs to the cycle of basic education.*

*Why does a bachelor need it?*

*Having mastered the material of the discipline, applicants for higher education will be able to use in their professional activities the provisions of legislative acts and regulations on occupational and civil safety; assess sanitary and hygienic conditions and level of safety; identify harmful and dangerous factors in the domestic and social environment; have the basic methods of saving life and health, including in emergencies. Students will gain knowledge of the basics of life and occupational and civil safety; labor management; economic and marketing components of occupational safety; basic provisions of fire safety; procedure for action in emergency situations, special, state of emergency and martial law. They will also be able to choose and use means of collective and personal protection; provide assistance and advice on practical safety issues; provide first aid; consciously act during evacuation measures.*

### **The purpose of the credit module**

*Formation of future specialists' awareness of the need and competencies to solve in primary positions typical tasks of all areas of professional activity with mandatory compliance with labor safety requirements and standards, responsibility for personal and collective safety in everyday conditions and during emergencies, special and martial law.*

### **The subject of the credit module:**

*Legislative, normative-legal, socio-economic, engineering-technical and sanitary-hygienic bases of life safety, labor safety and civil protection. Particular attention is paid to the functions of future bachelors in the field of occupational safety in primary positions, sanitary and hygienic requirements for working with computers and the rights, responsibilities and behavior of the population in emergencies, special and martial law.*

## **2. Program learning outcomes**

*Competences: (GC 10) Skills of performing safe activities; (GC 11) The ability to evaluate and ensure the quality of the work performed; (PC 10) The ability to apply industry standards and quality standards for the functioning of devices, devices and electronic systems in practice;. (PC 13) The ability to monitor and diagnose the condition of equipment, use modern electronic components and technical means, perform prevention, repair and maintenance of electronic devices and systems, mount, debug and repair analog, digital and optical modules, design and manufacture printed circuit boards, develop software for microcontrollers;*

*Program Outcomes: (PO 10) Develop technical means for building and diagnosing the technical condition of electronic devices and systems, organize and carry out scheduled and unscheduled repairs, tuning and retuning of electronic equipment in accordance with current production requirements; (PO 11) Argue the regulatory and legal principles when implementing electronic devices and systems; evaluate the advantages of engineering developments, their environmental friendliness and safety; defend one's worldview positions and beliefs in industrial or social activities; (PO 12) Use documentation related to professional activities, using modern technologies and office equipment; use the English language, including special terminology, to communicate with specialists, conduct literature searches and read texts on technical and professional topics; (PO 12) Develop working technical documentation, draw up design and construction work with verification of compliance with standards, technical conditions and other regulatory documents; (PO 20) Apply modern production quality control methods, conduct testing, certification and examination of production equipment, parts, assemblies and finished electronic and acoustic products and devices; (PO 21) Apply modern methods for the development of low-waste, energy-saving and environmentally friendly technologies that ensure the safety of people's lives and their protection from the possible consequences of accidents, disasters and natural disasters, apply methods of rational use of raw materials, energy and other types of resources.*

## **3. Pre-requisites and post-requisites of the discipline (place in the structural and logical scheme of training according to the relevant educational program).**

*Interdisciplinary connections: In the structural and logical scheme, the discipline "Occupational safety and civil protection" is studied at the stage of training of bachelor level specialists and is one that uses the achievements and methods of fundamental, applied sciences and the main disciplines of the cycle of professional and practical training. This provides an opportunity to teach the discipline taking into account the professional orientation of future specialists.*

*The working curriculum of the credit module is based on the curriculum of the discipline "Occupational safety and civil protection" approved by the Methodical Council of the Ihor Sikorskyi KPI (protocol No. 7 from 30.03.2017).*

## 4. The Content of the academic discipline

### Occupational and Civil Safety.

#### **Chapter 1.** *Life safety.*

Topic 1. Introduction. Course structure. Basic concepts and definitions.

Topic 2. Emergency situations: causes and classification.

Topic 3. Risk-oriented method of assessment of industrial hazards and emergency situations.

#### **Chapter 2.** *Occupational safety.*

Topic 4. Legal and organizational foundations of labor protection.

Topic 5. Occupational hygiene and industrial sanitation.

Topic 6. Personal protective equipment.

Topic 7. Production and industrial safety. Electrical safety.

#### **Chapter 3.** *Civil safety and fire safety.*

Topic 8. Emergency situations of man-made origin.

Topic 9. Fire and explosive safety.

Topic 10. Emergency situations of military origin

## 5. Educational materials and resources

### **Basic literature**

1. *Human Safety and Civil Protection. Practicum [Electronic resource]: the tutorial for undergraduate students/ Igor Sikorsky Kyiv Polytechnic Institute; compiles: O. Ilchuk, V. Kalinchyk, Yu. Polukarov, A. Piatova, O. Polukarov. – Electronic text data (1 file: 2,85 Mb). – Kyiv : Igor Sikorsky Kyiv Polytechnic Institute, 2021. – 64 p. <https://ela.kpi.ua/handle/123456789/41406>*

2. *Labour Protection and Civil Defense. Practicum [Electronic resource]: the tutorial for undergraduate students of specialties 152 «Metrology and information – measuring equipment» (educational program «Biomedical devices and information-measuring systems») and 163 «Biomedical engineering» (educational program «Medical engineering»)/Igor Sikorsky Kyiv Polytechnic Institute; compiles: O. Ilchuk, V. Kalinchyk, Yu. Polukarov, A. Piatova, O. Polukarov. – Electronic text data (1 file: 4,37 Mb). – Kyiv : Igor Sikorsky Kyiv Polytechnic Institute, 2021. – 103 p. <https://ela.kpi.ua/handle/123456789/41408>*

3. «Talking Safety: Teaching Young Workers About Job Safety and Health». Centers for Disease Control and Prevention. Createspace Independent Pub, 2010

4. *Labour Protection and Civil Defense: textbook for undergraduate students. O. Levchenko, O. Polukarov, O. Arlamov, Y. Polukarov, O. Zemlyanska ; edited by O. Levchenko. Kyiv : Igor Sikorsky Kyiv Polytechnic Institute, 2021. – 352 p.*

### **Additional literature**

*(optional / familiarization)*

5. Marsh, T. (2013). Talking Safety: A User's Guide to World Class Safety Conversation (2nd ed.). Routledge. <https://doi.org/10.4324/9781315241845>

6. SSN 239-96. State Sanitary Norms and Rules for Protecting the Population from the Influence of Electromagnetic Radiation.

7. SSN 476-2002. State Sanitary Norms and Rules During Work With Sources of Electromagnetic Fields

8. Arrangement Rules Electrical Installation dated July 21, 2017 No. 476. 264.

9. Zatsarniy V. V. Safety of life: Textbook [Electron resource] /V. V. Zatsarniy, N. A. Prachovnik, O. V. Zemlyanska et al. – K. : NTUU «KPI» IEE, 2016. – Access link: <http://ela.kpi.ua/handle/123456789/18263>.

10. Zhelibo Ye. P. Safety of life. Teaching manual / Ye. P. Zhelibo, N. M. Zaverukha, V. V. Zatsarniy ; Ed. E. P. Zhelibo. 6th appearance. – K.:Caravela, 2009. – 344 p.

11. Tretyakov O. V. Labour Defense: A Manual on a Test Complex on CD / O. V. Tretyakov, V. V. Zatsarniy, V. L. Bezonnyj ; Ed. K. N. Tank. – K. : Knowledge, 2010. – 167 p.
12. Tkachuk K. N. Fundamentals of labour defense: Textbook / K. N. Tkachuk, M. O. Khalimovsky, V. V. Zatsarniy and others. – K. : Basis, 2011. – 474 p.
13. Safety and Health at Work. International Labour Organization, 2017. <http://www.ilo.org/global/topics/safety-and-health-at-work/lang-en/index.htm>
14. MIL-STD-882E. (2012). Department of defense standard practice.system safety. Available at: <https://assist.dla.mil>.

*Literature, the bibliography of which is provided with a link, can be found on the Internet. Literature, the bibliography of which does not contain references, can be found in the library of Igor Sikorskyi KPI. Certain sections of the basic literature [1]-[4] are mandatory for reading. Sections of the basic literature, which are mandatory for reading, as well as the connection of these resources with specific topics of the discipline are given below, in the methodology of mastering the academic discipline. All other literary sources are optional, it is recommended to familiarize yourself with them.*

## Educational content

### 6. Methods of mastering an educational discipline (educational component)

*The educational discipline includes 36 hours of lectures, 36 hours of practical classes, as well as the completion of a modular control work (MCW), which consists of two parts (by topic), lasting 1 acad. hours each*

*Practical classes in the discipline are conducted with the aim of consolidating the theoretical provisions of the academic discipline and acquiring the skills and practical experience of students to operate with modern concepts in the field of labor protection and civil protection. Based on the distribution of time for studying the discipline, fourteen practical classes (including time for MCW) and four laboratory works are recommended.*

*Teaching methods and forms include not only traditional university lectures and seminar activities, but also elements of teamwork and group discussions. Active learning strategies are applied, which are determined by the following methods and technologies: problem-based learning methods (research method); personal-oriented technologies based on such forms and methods of learning as case technology and project technology; visualization and information and communication technologies, including electronic presentations for lectures. Communication with the teacher is built using the "Electronic Campus" information system, the "Sikorsky" distance learning platform based on G Suite for Education, as well as such communication tools as e-mail and Telegram. During training and for interaction with students, modern information and communication and network technologies are used to solve educational tasks.*

### Lecture classes

<i>n</i>	<i>The name of the topic of the lecture and a list of main questions (list of didactic tools, links to information sources)</i>
<b>Section 1. Life safety as a basic concept of sustainable development</b>	
1	<p><b>Topic 1. Introduction. Course structure. Basic concepts and definitions.</b>  <i>Basic concepts in the field of life safety, labor protection, civil protection. Terminology and definitions. International program of sustainable development. The main goals and objectives in the field of health protection of employees. Production sources of danger, dangerous and harmful factors.</i>  <i>Literary sources: [3, 4]</i></p>

n	The name of the topic of the lecture and a list of main questions (list of didactic tools, links to information sources)
2	<p><b>Topic 2. Emergency situations: causes and classification.</b>  The "human-technogenic-living environment" system. Emergency situations of technogenic, natural and social origin: causes and classification.  Literary sources: [3, 4, 11, 12]</p>
3	<p><b>Topic 3. Risk-oriented method of assessment of industrial hazards and emergency situations.</b>  Risk as an indicator of hazard assessment. Definition of the concepts of "danger" and "risk". General risk assessment at the workplace. Types of risks. The concept of "acceptable risk".  Literary sources: [3, 4, 11, 12]</p>
4	<p><b>Topic 3. Risk-oriented method of assessment of industrial hazards and emergency situations.</b>  Hazard classification. Risk assessment. Categories of severity of consequences. The level of probability of occurrence of hazards. Ranking of risks. Risk management strategy. Reduction of occupational risk through the implementation of preventive measures.  Literary sources: [3, 4, 11, 12]</p>
<b>Chapter 2. Occupational safety</b>	
5	<p><b>Topic 4. Legal and organizational foundations of labor protection.</b>  Legislation of the European Union and Ukraine in the field of labor protection and industrial safety. State Department of Labor Protection. The main provisions of the state social insurance against accidents at work and occupational diseases. Organization of labor protection at the enterprise.  Literary sources: [3, 4, 10, 13]</p>
6	<p><b>Topic 5. Occupational hygiene and industrial sanitation.</b>  General characteristics of working conditions in production. Requirements for production, auxiliary and premises with electrical installations. Requirements for the organization of the workplace. Requirements for organizing a workplace with a computer. Analysis of working conditions at energy enterprises. Peculiarities of working conditions at a computerized workplace  Literary sources: [3, 8]</p>
7	<p><b>Topic 5. Occupational hygiene and industrial sanitation.</b>  Methods of regulating the microclimate and the quality of the industrial air environment. Indicators and regulation of natural and artificial lighting of industrial premises  Literary sources: [5, 11]</p>
8	<p><b>Topic 5. Occupational hygiene and industrial sanitation.</b>  The main characteristics of noise, vibrations, ultra- and infrasound. The effect of noise on a person. Regulation, control and measurement of noise. Features of the occurrence of noise and vibrations in electrical installations. Ionizing radiation in electrical installations. Effects of ionizing radiation on humans. Indicators and</p>

n	The name of the topic of the lecture and a list of main questions (list of didactic tools, links to information sources)
	<p>standardization of ionizing radiation. Methods of monitoring at the workplace Literary sources: [5, 11 ]</p>
9	<p><b>Topic 6. Personal protective equipment.</b> Classification of personal protective equipment. Basic requirements for personal protective equipment. Recommendations for the selection and use of protective clothing, means of personal protection for the head, eyes, hands, organs of hearing and breathing Literary sources: [4, 6, 7]</p>
10	<p><b>Topic 7. Production and industrial safety. Electrical safety.</b> The urgency of the problem of electrical safety. General characteristics of electrical installations and thermal power equipment. Characteristics of regulatory documents on electrical safety and pressure vessels. Features of electrotraumatism. Literary sources: [3, 10]</p>
11	<p><b>Topic 7. Production and industrial safety. Electrical safety.</b> The main dangers of operating electrical installations (definition). Effect of electric current and electromagnetic field of industrial frequency on a person. Theoretical bases of the occurrence of danger during the use of electrical installations. Basic characteristics and normalization of the electromagnetic field of industrial frequency. Literary sources: [3, 11]</p>
12	<p><b>Topic 7. Production and industrial safety. Electrical safety.</b> Classification of technical methods of protection against direct contact in electrical installations. Electrical insulation in electrical installations: materials, characteristics, calculation, requirements and methods of measuring insulation of electrical installations. Protective means. Methods of safe placement of current-carrying parts. Means of safety blocking in electrical installations. Orientation in electrical installations. Literary sources: [3, 15]</p>
13	<p><b>Topic 7. Production and industrial safety. Electrical safety.</b> Classification of methods of protection against indirect contact and step voltage in electrical installations. The principle of protective action of protective grounding in electrical networks. Design of grounding devices. Requirements for grounding devices in electrical installations. Calculation method of the grounding device. Protective automatic shutdown. Protective equalization of potentials. Isolation zones. Ultra-low (low) voltage systems. Literary sources: [3, 15]</p>
14	<p><b>Topic 7. Production and industrial safety. Electrical safety.</b> Organization of safe operation of electrical installations. Requirements for employees who maintain electrical installations. Procedure for operation of operating electrical installations. Organizational measures during operation of operating electrical installations. Certification of the state of safety of electrical installations. Examination of consumers' electrical installations. Means of personal protection in electrical installations. Literary sources: [3, 15]</p>
<b>Chapter 3. Civil safety and fire safety.</b>	
15	<b>Topic 8. Emergency situations of man-made origin.</b>

n	The name of the topic of the lecture and a list of main questions (list of didactic tools, links to information sources)
	Types of man-made emergency situations. Stages of liquidation of emergency situations. Accidents at radiation-hazardous objects: causes, development, consequences. Protection system at radiation-hazardous objects. Accidents at chemically hazardous facilities. Literary sources: [3, 8, 12]
16	<b>Topic 9. Fire and explosive safety.</b> Flammability groups of substances. Categories of premises and buildings. Classification of explosive and fire-hazardous premises. Explosion and fire prevention system. Requirements for electrical installations in fire-hazardous and explosive-fire zones. Electrostatic spark safety measures in explosive and fire-hazardous areas. Equipping power facilities with primary fire extinguishing equipment. Literary sources: [3, 4, 14]
17	<b>Topic 9. Fire and explosive safety.</b> Risk-oriented approach to fire safety. Factors affecting the risks of fires and explosions. Physical basis of lightning manifestation. Lightning protection of buildings and structures. Classification of buildings and structures according to the level of lightning protection. Design features of the lightning conductor. Lightning protection design methods. Literary sources: [3, 11]
18	<b>Topic 10. Emergency situations of military origin.</b> Peculiarities of emergency situations during military operations on the territory of Ukraine. Preparation and evacuation from the occupied territories. Methods of protection during missile and artillery attacks. Characteristics of combat poisonous chemical substances. Ways of protection while being in the zone of influence of poisonous chemicals. Literary sources: [3, 6]

### Practical training

n	Name of the subject of the practical lesson and list of main questions (list of didactic tools, links to information sources)
1	<b>Topic 2. Impact of impressive, dangerous and harmful factors on human health.</b> Conducting informational work in abstract and presentational form on the impact of the most common affecting, dangerous and harmful professional factors. Literary sources: [1, 2]
2	<b>Topic 2. Impact of impressive, dangerous and harmful factors on human health.</b> Carrying out informational work in abstract and presentational form on the procedure for emergency situations of natural and social origin. Literary sources: [1, 2]
3	<b>Topic 3. Quantitative risk assessment of hazards.</b> Methods of carrying out the algorithm for calculating the risk of encountering a danger for yourself and another person during the year, based on the relevant conditions. Literary sources: [1, 2]
4	<b>Topic 3. Risk-oriented method of assessment of industrial hazards and emergency</b>

n	Name of the subject of the practical lesson and list of main questions (list of didactic tools, links to information sources)
	<p><b>situations.</b>  Methods of analyzing the occurrence of hazards depending on the type of professional activity; lifestyle (main causes of additional risk), place of residence and possible erroneous actions of the employee. A variant of the technical system is selected, for which a qualitative risk analysis of the occurrence of hazards during its operation will be considered. Guided by the results of the qualitative analysis, a hazard of category A is selected, for which a quantitative risk assessment is performed.  Literary sources: [1, 2]</p>
5	<p><b>Topic 5. General principles of providing first aid to victims.</b>  Practical methods of providing first aid to victims who have received the most common injuries (burn, cut, fall) or acute illness (exposure to current, poisoning by a chemical substance) are considered. The work consists in solving practical tasks, each of which describes the situation of a person receiving an injury. It is necessary to classify the injury (according to the degree of severity, depending on the influencing factors, according to the form of manifestation) and develop a strategy for providing first aid to the victim.  Literary sources: [1, 2]</p>
6	<p><b>Topic 5. Monitoring and ergonomic assessment of the workplace.</b>  Theoretical knowledge of the principles and methods of monitoring and ergonomic assessment of the workplace, practical skills of calculating the assessment before and after the measures taken to reduce hazards and improve ergonomic indicators. Recommendations for workplace optimization are provided.  Literary sources: [1, 2]</p>
7	<p><b>Topic 5. Evaluation and methods of cleaning the air of the working area and thermal protection.</b>  Theoretical knowledge of the main air parameters of the working area in workplaces, practical skills in evaluating them from the point of view of labor protection, getting acquainted with the main measures aimed at improving the air environment and thermal protection.  Literary sources: [1, 2]</p>
8	<p><b>Topic 5. Assessment and methods of ensuring compliance with occupational health and safety requirements of noise, ultrasound, and infrasound parameters at workplaces.</b>  Practical knowledge of the methods of assessing the parameters of noise, ultrasound, infrasound that occur at computerized workplaces in industrial premises, studying their effects on the human body, normalizing the parameters of these factors, familiarization with the main measures aimed at protecting workers from the negative effects of noise, ultrasound and infrasound.  Literary sources: [1, 2]</p>
9	<p><b>Topic 5. Evaluation of parameters and indicators of natural and artificial lighting of industrial premises.</b>  Practical knowledge of methods for evaluating parameters and indicators of natural and artificial lighting of office premises, determining the role of light in ensuring the safety of the production process, standardization of artificial and natural lighting, familiarization with the main measures aimed at ensuring favorable conditions for</p>



n	Name of the subject of the practical lesson and list of main questions (list of didactic tools, links to information sources)
	<p>visual work.  <b>Modular control work</b>  Literary sources: [1, 2]</p>
10	<p><b>Topic 7. Calculation of protective grounding.</b>  Students consolidate and deepen theoretical knowledge and acquire practical skills in calculating the resistance of a grounding device. Earthing is calculated in networks with a voltage of more than 1000 V and in networks with a voltage of up to 1000 V with a blindly grounded neutral.  Literary sources: [1, 2]</p>
11	<p><b>Topic 7. Signaling devices in safety management systems of electrical installations.</b>  The purpose of the work is the study of signaling as a means of warning the employee about the occurrence of certain possible events in the relevant production environment, the division of signaling by functional purpose into operative, warning and recognition.  The student needs to study the operation algorithm of the SLAS (3-module light) signal column and determine the type of light source in each of the 3 light modules and their modes of operation, as well as classify the functional purpose of these light modules according to the requirements of IEC/EN 60204-1, determine the mode of the acoustic module set with the help of a DIP switch (type of sound signal), examine the operating parameters of the signal light with a stroboscopic effect.  Literary sources: [1, 2]</p>
12	<p><b>Topic 9. Calculation of the protection zone of the lightning conductor.</b>  Definition of the category of lightning protection, get acquainted with the purpose and design features of lightning protection. They study the design of lightning protection devices, their placement and calculation methods; perform calculations of lightning protection elements and parameters of a lightning arrester designed to protect against direct lightning strikes.  Literary sources: [1, 2]</p>
13	<p><b>Topic 9. Methodology for assessing and ensuring fire safety at the enterprise.</b>  They familiarize themselves with the method of determining the category and class of the zone of premises according to explosion and fire danger, with fire prevention and fire protection measures.  Literary sources: [1, 2]</p>
14	<p><b>Topic 8. Peculiarities of civil protection in emergency situations.</b>  Carrying out informational work in abstract and presentational form on the procedure for man-made emergency situations. Preparation and evacuation from the occupied territories. Methods of protection during missile and artillery attacks.  Literary sources: [1, 2]</p>
15	<p><b>Topic 8. Forecasting and assessment of the consequences of explosions at the enterprise.</b>  Solving typical problems of assessing the consequences of the manifestation of hazards during accidents at an explosive facility. After explaining the methodology of the work, each student performs the necessary calculations based on the initial data according to an individual option.</p>

n	Name of the subject of the practical lesson and list of main questions (list of didactic tools, links to information sources)
	<i>Literary sources: [1, 2]</i>
16	<p><b>Topic 8. Assessment of the chemical situation during an accident or missile attack with the use of chemical weapons at the enterprise.</b></p> <p><i>Forecasting and assessment of the situation during an accident at an electric power facility where chemically hazardous substances are located; methods of operational and long-term forecasting; determination of quantitative territorial characteristics of the energy facility and drawing of zones of chemical contamination on the map (plan) of the area. Students learn: methods of forecasting and evaluating the chemical situation; the algorithm for determining the parameters of the chemical contamination zone (depth, width, area); assessment of the severity of the consequences of the accident. After explaining the method of performing the work, each student performs the necessary calculations based on the initial data of his option.</i></p> <p><i>Literary sources: [1, 2]</i></p>
17	<p><b>Topic 8. Forecasting and assessment of the radiation situation during an accident or missile attack on an enterprise.</b></p> <p><i>Forecasting and assessment of the radiation situation; methods of operational, long-term forecasting; modeling of zones of radioactive contamination (contamination) of the area; determination of geometric parameters of zones; assessment of the probability of the electric power facility entering the contamination zone and the duration of contamination; display of zones on the terrain plan (map). After explaining the method of performing the work, each student performs the necessary calculations based on the initial data of his option.</i></p> <p><i>Literary sources: [1, 2]</i></p>
18	<p><b>Topic 8. Assessment of the reliability of the protection of employees of the object of economic activity from the use of protective structures in wartime.</b></p> <p><i>Determination of the most reliable way to protect people in emergency situations thanks to their shelter in specialized engineering structures: warehouses and anti-missile shelters. Clarification of the basic rules of behavior during artillery, bomb and rocket attacks. After explaining the method of performing the work, each student performs the necessary calculations based on the initial data of his option.</i></p> <p><b>Modular control work</b></p> <p><i>Literary sources: [1, 2].</i></p>

## 7. Independent work of the student

*Independent work consists of the following types of activities: preparation for classroom lectures, practical classes; calculations based on primary data obtained in practical classes; writing an essay; doing homework. The plan for the distribution of hours by individual types of independent work is provided in Table 1.*

*Table 1. Hour distribution plan*

<i>Type of independent work</i>	<i>Total hours</i>
<i>Preparation for classroom lectures, practical</i>	24
<i>Calculations based on primary data obtained in practical classes</i>	6
<i>Writing an essay (optional)</i>	8
<i>Execution of two home control robots</i>	4

Test/survey	6
Totally	48

## Policy and control роль

### 8. Policy of educational discipline

*The system of requirements that the teacher sets before the student:*

- *rules for attending classes: in accordance with Order 1-273 dated 14.09.2020, it is prohibited to assess the presence or absence of the applicant at the classroom class, including awarding incentive or penalty points for this. According to the rating system of this discipline, points are awarded for the appropriate types of educational activity in lectures and practical classes.*

*At the time of each class (lecture, practical), the student must have the Zoom application installed on the device from which he works (in the case of distance learning), and also open the course "Occupational and civil safety " on the "MOODLE" platform (code access to the course is provided at the first lesson according to the schedule). Syllabus; lecture material; practicum; tasks for each practical and laboratory session; variants of modular control work; tests to be completed after the lecture and practical classes; the list of questions for assessment is posted on the "MOODLE" platform and in the "KPI Electronic Campus" system».*

- *rules of behavior in classes: the student has the opportunity to receive points for the appropriate types of educational activity in lectures and practical classes, provided for by the rating system of the discipline. The use of communication tools to search for information on the teacher's Google Drive, on the Internet, in a distance course on the "Moodle" platform is carried out on the condition that the teacher instructs;*
- *rules for the protection of individual tasks: the curriculum does not provide for the implementation of an individual task;*
- *rules for assigning incentive and penalty points: incentive and penalty points are not included in the main scale of the rating system, and their sum does not exceed 10% of the maximum number of points. The total amount of incentive points cannot exceed 10 points. Incentive points are awarded for participation in scientific conferences, student competitions and Olympiads, for writing an article and its publication. For participation in the All-Ukrainian Olympiad (competition of scientific works), a student is awarded 5 (I round) or 10 (II round) points. A student is awarded 10 points for writing an article and publishing it (professional edition of Ukraine). 10 points for publication of report abstracts and presentation at a scientific conference. Penalty points are not accrued;*
- *policy of deadlines and rescheduling: each student is obliged to adhere to the deadlines for the completion of tasks within the schedule of conducting classroom classes on the discipline. Completion of the modular control work, the completion of tasks for practical classes is the mandatory control measure of assessment for admission to the credit. A student who, for a good reason (hospital, academic mobility, etc.) did not write a modular test, has the right to do so during regular consultations of the teacher according to the schedule. The procedure for rescheduling semester control is determined by the general rules of the university<sup>1</sup>.*

<sup>1</sup> Provisions on current, calendar and semester control of study results at KPI named after Igor Sikorskyi (Appendix 1 to Order No. 7-137 dated August 08, 2020).URL: [https://kpi.ua/document\\_control](https://kpi.ua/document_control)

- *policy on academic integrity: the Code of Honor of the National Technical University of Ukraine "Kyiv Polytechnic Institute" <https://kpi.ua/files/honorcode.pdf> establishes general moral principles, rules of ethical behavior of individuals and provides a policy of academic integrity for persons working and studying at the university, which they should be guided by in their activities, including when studying and preparing control measures in the discipline "Labor safety and civil protection". Teachers and students studying this discipline are obliged to comply with the provisions of the University's Code of Honor<sup>2</sup>;*
- *when using digital means of communication with the teacher (mobile communication, e-mail, correspondence on forums and social networks, etc.), it is necessary to observe generally accepted ethical norms, in particular, be polite and limit communication to the teacher's free working hours (from 16:00 to 19:00 -00 hours on working days).*

**Inclusive education.** *The acquisition of knowledge and skills during the study of the discipline can be accessible to most individuals with special educational needs, except for learners with severe visual impairments that do not allow them to complete tasks with the help of personal computers, laptops and/or other technical means.*

**Studying in a foreign language.** *In the course of the tasks, students may be recommended to refer to foreign language sources.*

## 9. Types of control and rating system for evaluating learning outcomes (RS)

**Current control:** *testing, modular control work and performance of tasks for practical classes.*

**Calendar control:** *is held twice a semester as a monitoring of the current state of fulfillment of the syllabus requirements.*

**Semester control:** *test.*

1. *A student's credit module rating is calculated out of 100 points. The rating (during the semester) consists of points that the student receives for:*

- *testing based on lecture materials (12 points);*
- *performance of tasks for practical classes (68 points);*
- *writing a modular test (20 points).*

2. *Scoring criteria:*

2.1 *Testing based on lecture materials: weighted point – 6. The maximum number of points for testing – 6 points \* 2 tests = 12 points.*

*The student performs testing in the form of individual independent homework on the topic "Procedure of monitoring at the workplace of an electrical worker" after studying topics 5, 6, 7 in lecture classes.*

2.2 *Completion of tasks for practical classes: weighted point – 4. Maximum number of points for completing tasks for practical classes – 4 points \* 17 tasks = 68 points.*

*In practical classes, students together with the teacher solve tasks according to the subject of the practical class. After the practical lesson, students receive a homework assignment that must be solved and submitted to the teacher for review before the start of the next lesson (usually it is 2 weeks, but sometimes this time can be changed by the teacher under certain conditions).*

*Evaluation criteria:*

- *the homework was solved correctly and submitted within the set deadline - 4 points;*
- *the homework was solved correctly, but it was handed in after the set deadline - 2 points;*
- *the homework was solved with minor errors and passed within the set time limit - 3 points;*

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<sup>2</sup> *Code of honor of the National Technical University of Ukraine "Kyiv Polytechnic Institute». URL: <https://kpi.ua/code>*

- the homework was solved with minor errors and passed after the set deadline - 1 point;
- the homework is solved with errors - it is returned for revision.

2.3. Writing a modular control paper (MCP): the weighted point for one MCP is 10. The maximum score for two MCP is 20 points. During the semester, one modular test is conducted, which is divided into two one-hour tests, for each of which the following assessment criteria are established:

- full answer to theoretical questions, problems solved correctly 9-10 points
- answer to theoretical questions with minor inaccuracy, minor errors in solving problems 7-8 points
- answers to theoretical questions are not complete or significant errors in solving problems 1-6 points
- unsatisfactory answer to theoretical questions, incorrect solution of problems 0 points

In order to give students the opportunity to correct the points received for the modular control work (at the student's own request), one day is set at the end of the semester, on which the assignments are resubmitted.

During the exam session, assignments are not resubmitted.

3. Calendar control: conducted twice a semester as a monitoring of the current status of meeting the syllabus requirements. The condition for a positive first and second calendar control is to obtain at least 50% of the maximum possible rating at the time of the corresponding calendar control.

4. The condition for admission to the credit is the enrollment of tasks in practical and laboratory classes, the completion of two modular control papers and a starting rating of at least 60 points.

5. A student can receive a credit based on the results of the points he received during the semester. If the student wants to increase the points, crediting is carried out. During the assessment, students perform test tasks. Test tasks are valued at 40 points. The assessment task consists of test tasks that contain twenty questions, each of which offers several answers, only one of which is correct. Each correct answer is valued at 2 points.

6. The sum of the starting points and the points for the test assignment is transferred to the final grade according to table 2.

Table 2. Total number of points

Evaluation method	Number	Minimum score in points	Maximum score in points
Testing based on lecture materials	2	8	12
Completion of tasks for practical classes	17	32	68
MCP	2	10	20
Starting rating		60	100
Test	1	40	-
Final rating		100	100

For correspondence education

**Current control:** performance of tasks for practical classes (40 points) and MCP (20 points). The structure of MCP, practical work, tests, requirements for them and evaluation criteria are similar to those for full-time education and are given above.

**Semester control:** test. Conditions for admission to the semester control: completed and credited MKR and tasks for practical classes and a starting rating of at least 60 points.

Students who have fulfilled the conditions for admission to credit, perform test tasks. Credit test tasks are valued at 40 points. The evaluation criteria are given above. The sum of starting points and points for the test assignment is transferred to the final grade according to table 3.

Table 3. Correspondence of rating points to grades on the university scale

Number points	Assessment on the university scale
100-95	Perfectly
94-85	Very good
84-75	Good
74-65	Satisfactorily
64-60	Enough
Less 60	Unsatisfactorily
Admission conditions are not met	Not allowed

#### **10. Additional information on the discipline (educational component)**

*List of topics that are submitted for semester control:*

*Topic 1. Introduction. Course structure. Basic concepts and definitions.*

*Topic 2. Emergency situations: causes and classification.*

*Topic 3. Risk-oriented method of assessment of industrial hazards and emergency situations.*

*Topic 4. Legal and organizational foundations of labor protection.*

*Topic 5. Occupational hygiene and industrial sanitation.*

*Topic 6. Personal protective equipment.*

*Topic 7. Production and industrial safety. Electrical safety.*

*Topic 8. Emergency situations of man-made origin.*

*Topic 9. Fire and explosive safety.*

*Topic 10. Emergency situations of military origin*

*The list of questions submitted for semester control is given in the appendix to the syllabus.*

*A student of higher education has the opportunity to take an online course(s) on one or more topics provided by the work program of the academic discipline. The applicant can choose an online course independently or on the recommendation of a teacher. 1 hour of the course is valued at 0.83 points. The maximum number of hours that can be credited for the results of non-formal education is 12 hours, accordingly the maximum number of points for such results is 10 points.*

*For self-study, relatively simple questions are offered, which in most cases are descriptive in nature, designed to expand students' horizons and repeat materials studied in other disciplines, and are directly related to the discipline.*

#### **Working program of the academic discipline (syllabus):**

**Compiled by:**

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**Approved** by the Department of Labor protection, industrial and civil safety (protocol № 10 to 14.06.2023).

**Approved** by the Methodical Commission of the Institute of Energy Saving and Energy Management