



Fundamentals of environmental standardization and inspection

Work program of the discipline (Syllabus)

Details of the discipline

Level of higher education	<i>second (master's)</i>
Field of knowledge	<i>16 Chemical and bioengineering</i>
Speciality	<i>161 Chemical technologies and engineering</i>
Educational program	<i>Industrial ecology and resource-efficient clean technologies</i>
Discipline status	<i>Custom</i>
Form of study	<i>full-time (day)/remote/mixed</i>
Year of preparation, semester	<i>1 st year, spring semester</i>
Scope of discipline	<i>5 credits (150 hours)</i>
Semester control/ control measures	<i>Exam/modular test paper</i>
Schedule of classes	<i>4 hours a week (3 hours and lectures and 1 hour of practical classes)</i>
Language of instruction	<i>Ukrainian</i>
Information about the course / teachers	Lecturer: https://eco-paper.kpi.ua/pro-kafedru/vykladachi/nosachovayuliya-viktorivna.html Practice: https://eco-paper.kpi.ua/pro-kafedru/vykladachi/nosachovayuliya-viktorivna.html Lecturer: https://eco-paper.kpi.ua/pro-kafedru/vykladachi/radovenchikvyacheslav-mikhajlovich.html
Course placement	<i>https://do.ipk.kpi.ua/course/view.php?id=6069</i>

The program of the discipline

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

The subject of the discipline is the study of the general basics of standardization and certification, the peculiarities of environmental standardization and certification, the requirements for monitoring and assessing the degree of environmental safety of economic activity and the environmental situation prevailing at production facilities or territories.

The purpose of studying this discipline is to form in students a set of knowledge, skills, abilities necessary to identify the priorities of solving environmental problems and prepare reasonable environmental and economic recommendations on the strategy and tactics for solving environmental problems is one of the main tasks of the strategy of human survival.

In accordance with the goal, the training of masters and specialists requires the strengthening of students' competencies:

- the ability to organize works related to the assessment of the ecological state, environmental protection and optimization of nature use.

The main tasks of the academic discipline.

According to the requirements of the educational-professional and educational-scientific program, after mastering the academic discipline, students must demonstrate the following learning outcomes:

- to organize one's work and the work of the team in the conditions of industrial production, project divisions, research laboratories, determine goals and effective ways of achieving them, motivate and train personnel;

- to know modern approaches to the organization of ecologically clean productions, reorganization and reconstruction of existing productions from the point of view of resource conservation.

Prerequisites and post-requisites of disciplines (place in the structural and logical scheme of education according to the relevant educational program)

The discipline "Fundamentals of environmental standardization and inspection" is preceded by academic disciplines studied in the bachelor's degree. Academic discipline "Fundamentals of environmental standardization and inspection" provides the defense of the master's thesis.

2. CONTENT OF EDUCATIONAL MATERIAL

Part 1

Section 1. State bodies of environmental control and inspection, inspections

Topic 1. State bodies of environmental control and inspection

Topic 2. Conducting inspections on environmental protection

Topic 3. Identification of violations and application of measures of influence to violators of environmental legislation

Section 2. Verification of enterprises and time standards for inspection

Topic 6. Inspection of air protection activities of enterprises and time standards for inspection

Topic 8. Verification of water protection activities and time standards for inspection

Section 3. Implementation of state control over the protection of lands, forests and other plant resources

Topic 9. Environmental control over the impact of livestock farms on water bodies

Topic 10. Implementation of state control over waste management

Topic 11. The procedure for planning, conducting and registration of inspections of the conditions of use and protection of land, as well as the application of measures of influence to violators of land legislation

Topic 12. Implementation of state control over the protection, protection, use, reproduction of forests and other plant resources

Topic 13. Implementation of state control in the field of protection, use and reproduction of wildlife (fish resources)

Part 2

Section 1. General principles of metrology, standardization and certification.

Topic 1. The relationship of metrology, standardization and certification.

Topic 2. The essence and purpose of certification activities. Formation and development of metrology, standardization, certification.

Section 2. Metrology in the ecological sphere

Topic 3. Physical quantities as the main object of measurement. Basic units of physical quantities.

Topic 4. Types, methods and measuring instruments. Classification of measuring instruments.

Topic 5. Measurement errors. Characteristics of measurement quality. Verification of measuring instruments. Standards of units of physical quantities. Ensuring the uniformity of measurements. Methodological principles of measurement of non-electrical quantities.

Topic 6. Methods of analysis of the environment. Methodological support for the control of air pollution. Metrological support for water quality control. Metrological support for soil quality control.

Topic 7. Methods and measuring instruments designed to control the content of heavy metals and radionuclides. Statistical processing of measurement results.

Section 3. Standardization in the field of ecology

Topic 8. General principles of international standardization.

Topic 9. The role of standardization in environmental protection. Harmonization of water quality standards. Standardization of agricultural products.

Topic 10. Informing about the compliance of goods with the established requirements. bar coding. Labeling of food additives.

Topic 11. The structure of state bodies as a means of ensuring the quality of life.

Section 4. Certification as a means of ensuring the quality of life.

Topic 12. Norms and rules of certification. Accreditation of certification bodies.

Topic 13. Quality management. Certification of environmental management systems. Supervision of product quality and quality systems.

Topic 14. Agreements on mutual recognition as a method of harmonization of requirements for the quality of objects.

Learning materials and resources

Basic

1. Klimenko M.O., Prischepa A.M., Stetyuk L.M., Brezhynska O.A. E. environmental inspection. Kherson: Oldie+, 2020. 400 p.

2. Environmental inspection. Textbook on practical (seminar) classes [Electronic resource]: textbook. posib. for stud. specialties 101 "Ecology" OP "Ecological safety", 161 "Chemical technologies and engineering" OP "Industrial ecology and resource-efficient clean technologies" / KPI them. Igor Sikorsky; compiled by: Y. V. Nosachova, T. O. Shabliy. – Electronic text data (1 file: 2.40 MB). – Kyiv: KPI them. Igor Sikorsky, 2020. – 230 p.

3. Klimenko M.O., Skrypchuk P.M. Metrology, standardization and certification in ecology. – K.: Academy, 2006. - 368 p.

4. Standardization, metrology, certification and quality management: Textbook / L.V. Bal-Prylypko, N.M. Slobodanyuk, G.E., Polishchuk, M.Z. Paska, V.G. Burak. - K.: CP "Komprint" - 2017. - 573 p.

5. Tarasova V.V., Malinovsky A.S., Rybak M.F. Metrology, standardization and certification. Textbook /Zag. ed. V.V.Tarasova. – K.: Center for Educational Literature, 2006. – 264 p.

Secondary

1d. Regulations on the State Environmental Inspectorate. – Confirmed by the Resolution of the Cabinet of Ministers of Ukraine as amended on June 16, 2004, No. 770.

2d. Regulations on the State Environmental Inspectorate in regions, cities of Kyiv and Sevastopol. – Approved by the order of the Ministry of Environment of December 19, 2006, No. 548.

3d. *Regulations on the State Environmental Inspectorate of the Sea of Azov.* – Confirmed by the order of the Ministry of Environment of February 23, 2004, No. 64.

4d. *The procedure for organizing and conducting inspections of business entities for compliance with the requirements of environmental legislation.* – Confirmed by the order of the Ministry of Environment of September 10, 2008, No. 464.

5d. *Methodical recommendations "On the procedure for conducting inspectorate inspections on compliance by nature users with the requirements of legislation on environmental protection"* – Confirmed by the order of the Main Environmental Inspectorate of the Ministry of Environment of March 28, 1994, No7.

6d. *Methodical recommendations "On the procedure for detecting violations and applying measures of influence to violators of environmental legislation"* – Collection of methodological recommendations on state control over compliance with the requirements of environmental legislation" – Edited by A.M. Korenchuk, V.D. Solodkyy. – Chernivtsi: Zelena Bukovyna, 1996. – p. 17-42.

7d. *Sivak V.K. Environmental Inspection. Textbook posib./V.K. Sivak, V.D. Solodkyy.* – Chernivtsi: Zelena Bukovyna, 2003. – 200 p.

8d. *The procedure for restriction, temporary prohibition (suspension) or termination of the activities of enterprises, institutions, organizations and objects in case of violation of the legislation on environmental protection.* – Approved by the Resolution of the Verkhovna Rada of October 29, 1992, No. 2751 – XII.

9d. *List of activities related to environmental measures.* – Approved by the Resolution of the Cabinet of Ministers of Ukraine as amended on December 17, 2004, No. 1700.

10d. *Law of Ukraine "On Air Protection".* – Collection of Legislative Acts: Legislation of Ukraine on Environmental Protection. – Kyiv, Parliamentary Publishing House. – 2006, p. 79-95.

11d. *Law of Ukraine "On Land Protection".* – Collection of Legislative Acts: Legislation of Ukraine on Environmental Protection. – Kyiv, Parliamentary Publishing House. – 2006, p. 96-119.

12d. *Law of Ukraine "On State Control over the Use and Protection of Land"* – Collection of Legislative Acts: Legislation of Ukraine on Environmental Protection. – Kyiv, Parliamentary Publishing House. 2006, p. 120-129.

13d. *Regulation "On establishing the levels of harmful effects of physical and biological factors on atmospheric air"* – Confirmed by the Resolution of the Cabinet of Ministers of Ukraine of December 31, 1993, No. 1092.

14d. *Instruction "On the content and procedure for drawing up a report on the inventory of emissions of pollutants at the enterprise."* – Approved by the order of the Ministry of Environment of February 10, 1995, No. 7.

15d. *Methodical recommendations "On time standards in the implementation of work on state control over compliance with environmental legislation"* – Collection of methodological recommendations on state control over compliance with the requirements of environmental legislation. – Edited by A.M. Korenchuk, V.D. Solodkyy. – Chernivtsi: Zelena Bukovyna, 1996. – p. 201-213.

16d. *Instruction "Requirements for the placement and equipment of sampling sites from gas-dust flows."* – Ibid. – pp. 214-216.

17d. *Regulations "On the conduct of the operation "Clean air".* - There. Same. – pp. 176-188.

18d. *Instruction "On water sampling".* – Ibid. – pp. 217-220.

19d. *Methodical recommendations "On the implementation of environmental control over the impact of livestock complexes on water bodies."* – Ibid. – p. 128 – 134.

20d. *The procedure for planning and conducting inspections on the implementation of state control over the use and protection of land.* – Confirmed by the order of the State Committee on Land Resources of December 12, 2003, No. 312.

21d. *Nekhoroshkov V.P. Environmental inspection: educational assistant.* Odessa State Academy of Cold. 2011 – 156 p.

22d. *Methodical instructions for practical (seminar) work and for the implementation of independent work on the course "Environmental Inspection" for students of the specialty 7.04010601, 8.04010601 Ecology and environmental protection.*

23d. *Instruction on registration by state inspectors for control over the use and protection of lands of the State Land Inspectorate and its territorial bodies of materials on administrative offenses.* – Approved by the order of the State Committee on Land Resources of April 28, 2009, No. 205.

24d. *The procedure for establishing standards for the fee for environmental pollution and the collection of this fee.* – Approved by the Resolution of the Cabinet of Ministers of Ukraine dated March 1, 1999, No. 303.

25d. *Instruction on the procedure for calculating and paying the fee for environmental pollution.* – Approved by the order of the Ministry of Environment and the State Tax Administration of July 19, 1999, No. 544/3837.

26d. *Methodology for calculating the amount of compensation for losses caused to the state as a result of violation of the legislation on the protection and rational use of water resources.* – Approved by the order of the Ministry of Environment of July 20, 2009, No. 389.

27d. *Legislation of Ukraine on Environmental Protection. Collection of Legislative Acts.* – Kyiv, Parliamentary Publishing House, 2006. – 200p.

28d. *Rules of technical operation of gas treatment plants, approved by the Order of the Ministry of Environmental Protection of Ukraine dated February 6, 2009 No. 52, registered in the Ministry of Justice of Ukraine on April 13, 2009 under No. 327/16343*

29d. *On the approval of the State sanitary and anti-epidemic rules and regulations for the management of medical waste.* MINISTRY OF HEALTH OF UKRAINE ORDER OF 08.06.2015 No 325

30d. *On approval of the Instruction on selective diagnostic shooting of game animals for veterinary and sanitary examination.* H a k a s N 94 from 09.10.2001.

31d. *Tsutsyura, S. V. Metrology, fundamentals of measurements, standardization and certification : textbook posib. / S. V. Tsutsyura, V. D. Tsutsyura. - 3rd ed., stereot. - K. : Knowledge, 2006. - 242 p.*

- 32d. Bychkivskyy, R. V. Metrology, standardization, quality management and certification: textbook / R. V. Bychkivskyy, P. G. Stolyarchuk, P. R. Gamula. - 2nd ed., ed. and additional - Lviv : Lviv. Polytechnic, 2004. - 560 p.
- 33d. Prutsakova O.L. Ecological labeling of goods safe for consumption / Ecological Bulletin. – 2004. – P.15 – 19.
- 34d. Petrovska M. Standardization, metrology and certification of the environment: textbook. Petrovskaya. - Lviv : Publishing Center of Ivan Franko National University of Lviv, 2010. - 420 p.
- 35d. Polishchuk E.S., Dorozhovets M.M., Yatsuk V.O. Metrology and measuring equipment. – Lviv, 2003. – 544 p.

Educational content

5. Methods of mastering the discipline (educational component)

Lectures

Lectures are aimed at:

- providing modern, holistic, interdependent knowledge of the discipline "Fundamentals of environmental standardization and inspection", the level of which is determined by the target setting for each specific topic;
- ensuring in the process of the lecture the creative work of students together with the teacher;
- education of students' professional and business qualities and the development of their independent creative thinking;
- formation of students' necessary interest and providing direction for independent work;
- determination at the modern level of development of science and technology in the field of environmental protection, forecasting their development for the coming years;
- reflection of the methodological processing of the material (selection of the main provisions, conclusions, recommendations, clear and adequate to their formulations);
- use for demonstration of visual materials, combination, if possible, them with a demonstration of results and samples;
- teaching research materials in a clear and high-quality language in compliance with structural and logical connections, explaining all newly introduced terms and concepts;
- accessibility for perception by this audience.

No s/n	The title of the lecture topic and the list of main issues (list of didactic tools, references to literature and tasks for the ISW)	Number of hours
<i>Part I</i>		
1	<p style="text-align: center;">State bodies of environmental control and inspection</p> <p>The system of environmental control and inspection bodies. State control authorities. Environmental inspection bodies in the system of state environmental control. Public bodies of environmental control. Powers of environmental control bodies. Powers of state control bodies. Powers and rights of public environmental organizations. Powers and rights of public environmental inspectors. Forms of environmental control.</p> <p>Literature:[1] □pp. 10-61,[21d] pp. 8-15,[1d, 2d, 3d].</p> <p>The task at the ISW is to get acquainted with the main legislative acts in various fields of environmental protection [1d, 2d, 3d, 27d].</p>	2
2	<p style="text-align: center;">Conducting inspections on environmental protection</p> <p>Legal aspects of inspections. General information about the implementation of the check. Planning, organization, appointment procedure and preparation for inspection. Types and parts of the check. Rights and obligations of state inspectors.</p> <p>Literature:[1]art.62-88; [21d]art. 40-50, [5d]</p> <p>The task for the ISW is the powers possessed by public inspectors for the protection of the NPS. To consider the forms of statistical reporting of economic objects for the protection of nps[1] art. 46-52, [□□ð]</p>	2
3	<p style="text-align: center;">Identification of violations and application of measures of influence to violators of environmental legislation</p> <p>Cases of detection of facts of violation of environmental legislation. Registration (fixation) of the fact of violation. The procedure for applying measures of influence.</p> <p>Literature:[□ð]; [21d] pp. 117-120.</p> <p>The task at the ISW is to consider what legislative acts guide the state inspector in drawing up the protocol [5d]</p>	1
4	<p style="text-align: center;">Inspection of air protection activities of enterprises and time standards for inspection</p> <p>Stationary sources of pollution. Materials and documents considered during the inspection of the enterprise. Detection of excess and ultra-limit emissions. Inspection of the sanitary and industrial laboratory of the enterprise. Requirements for the placement and equipment of sampling sites from gas-dust flows. Mobile sources of pollution. What should be checked at car enterprises? Operation Clean Air. Time standards when checking compliance with air protection legislation by enterprises. Enterprises with stationary sources of pollution. Auto enterprises.</p> <p>Literature:[1d] pp. 264-290:[21d] pp.61-75.</p> <p>The task at the ISW is to characterize the criteria for rationing the quality of the environment in the field of air protection [13d, 28d].</p>	2
5	<p style="text-align: center;">Verification of water protection activities and time standards for inspection</p> <p>Check water consumption. Checking drainage. Checking the sanitary condition of the territory of the facility and potential sources of contamination of surface and groundwater. Inspection of water protection activities. Water sampling. General requirements for sampling, types of samples and safety.</p>	1

	<p><i>Sampling locations, time and frequency of sampling. Equipment, dishes and sampling methods. Registration, storage and transportation of samples. Time standards when checking enterprises for compliance with water protection legislation. General information. Time standards.</i></p> <p>Literature:[1d] art. 66-72; [21d] art. 100-102, [15d],[18d]</p> <p><i>The task at the ISW is to characterize the ownership of water [27d]</i></p>	
6	<p>Implementation of state control over waste management</p> <p><i>Issues that are considered when checking the object on which waste is generated, placed and disposed of. The main types of violations in the field of waste management.</i></p> <p>Literature:[1] pp. 291-310;</p> <p><i>The task at the ISW is to characterize the requirements of waste management of medical institutions [29 d]</i></p>	1
7	<p>The procedure for planning, conducting and registration of inspections of the conditions of use and protection of land, as well as the application of measures of influence to violators of land legislation</p> <p><i>Legal aspects of state control over the use and protection of land. Methods of state control. Types of checks. Scheduled inspections. Unscheduled inspections. Operational checks. The procedure for conducting inspections. Paperwork based on the results of inspections. The procedure for applying measures of influence to violators of land legislation. Forms of documents (act, protocol, prescription) based on the results of inspections.</i></p> <p>Literature:[1] □pp. 126-144;[21 d] pp. 110-128.</p> <p><i>Task at the ISW – To analyze legal documents in the field of land protection [20 d], [23 d]</i></p>	1
8	<p>Implementation of state control over the protection, protection, use, reproduction of forests and other plant resources</p> <p><i>The concept of "forest", "grassy resources", objects of the plant world. Natural complexes of the nature reserve fund of Ukraine. Checking the condition of forests and other plant resources. The main types of violations in the field of protection of forests and other plant resources.</i></p> <p>Literature:[1]st.221-263, 89-106</p> <p><i>The task of the ISW is a full-scale verification of compliance with the requirements of environmental legislation in the territories of nature reserves[1] pp.95-100</i></p>	1
9	<p>Implementation of state control in the field of protection, use and reproduction of wildlife (fish resources)</p> <p><i>Objects of the animal world. Protection of the animal world. The main types of violations in the field of wildlife protection. Protection of fish stocks. The main types of violations in the field of protection of fish stocks.</i></p> <p><i>Literature: [1] □pp. 107-125</i></p> <p><i>Task on the ISW – Indicate the reasons for planning the shooting of wild animals [30d]</i></p>	1
<i>Part II</i>		
1	<p><u><i>The relationship of metrology, standardization and certification.</i></u> <i>The essence and tasks of metrology.</i></p> <p>Literature: 3. pp.7-14; 4. C.25-33.</p> <p><i>The task on the ISW is Measurement in a person's life. [35d.p. 5-10; 31d. C.11-23].</i></p>	2
2	<p><u><i>The essence and purpose of certification activities.</i></u> <i>Formation and development of metrology, standardization, certification.</i></p> <p>Literature: 3. p.19-26; 4. C.233-255.</p> <p><i>The task at the ISW is Environmental Certification. [34d. p.293-38].</i></p>	2
3	<p><u><i>Physical quantities as the main object of measurement.</i></u> <i>Basic units of physical quantities. International systems of units of measurement of physical quantities.</i></p> <p>Literature: 3. p.27-36; 4. C.25-49.</p> <p><i>The task on the ISW is non-system units of physical quantities. [32d. p.57-60; 35d. C.14-24].</i></p>	2
4	<p><u><i>Types, methods and means of measurement.</i></u> <i>Classification of measuring instruments. Parameters of measuring instruments.</i></p> <p>Literature: 3. pp.37-49.</p> <p><i>Tasks on the ISW – The main characteristics of measuring instruments [35d. s.24-37; 32d. C.65-70].</i></p>	2
5	<p><u><i>Measurement errors.</i></u> <i>Characteristics of the quality of measurements. Verification of measuring instruments. Standards of units of physical quantities.</i></p> <p>Literature: 3. pp.50-65; 5. s.36-52.</p> <p><i>The task on the ISW is the verification of measuring instruments [32d. p.92-98; 31d. C.97-104].</i></p>	2
6	<p><u><i>Ensuring the unity of measurements.</i></u> <i>Methodological principles of measurement of non-electric quantities.</i></p> <p>Literature:3. pp.66-83; 4. C.66-68.</p> <p><i>The task on the ISW is the Measurement of electrical quantities [31d. p.36-45; 35d. C.248-258].</i></p>	2
7	<p><u><i>Methods of analysis of the environment.</i></u> <i>Methodological support for controlling air pollution.</i></p> <p>Literature: 3. c.84-111.</p> <p><i>Tasks on the ISW – Devices for air sampling [35d.s.502-513].</i></p>	2
8	<p><u><i>Metrological support for water quality control.</i></u> <i>Metrological support for soil quality control.</i></p> <p>Literature: 3. pp.112-153.</p> <p><i>Tasks for ISW – Devices for water sampling [35hp492-502; 9.pp.162-189].</i></p>	2
9	<p><u><i>Methods and measuring instruments</i></u> <i>designed to control the content of heavy metals and radionuclides.</i></p> <p>Literature: 3. c.154-169.</p>	2

	<i>Tasks on the ISW – Devices for soil sampling [35d. p.513-515].</i>	
10	<i>Statistical processing of measurement results. International cooperation in the field of metrology. Literature: 3. c.170-184; 5. c.53-70. Task at the ISW – Participation of Ukraine in the work of international organizations [32d.p.363-372; 34d.p.337-357].</i>	2
11	<i>General principles of international standardization. Development of international standards. Literature: 3. pp.185-195; 5. C.106-117. Tasks on the ISW – The need for standardization in ecology [34d.p.79-86; 32d.p.23-25].</i>	2
12	<i>Features of standardization in developed European countries. The role of standardization in environmental protection. Harmonization of water quality standards. Literature: 3. pp.199-209; 5.s.106-123. The task at the ISW is the development of standardization in Ukraine [32d. p.19-25].</i>	2
13	<i>Standardization of agricultural products. Environmental labeling. Informing about the compliance of goods with the established requirements. Literature: 5. pp.220-245; 2.pp.354-373. Task on the ISW – Fundamentals of environmental labeling [34d. pp. 134-160; 32d. C.391-427].</i>	2
14	<i>Bar coding. Labeling of food additives. Structure of state bodies as a means of ensuring the quality of life. System of environmental standards in Ukraine. Literature: 3.c.247-278. The task at the ISW is the Fundamentals of Environmental Labeling. [32d. s. 19-25; 33d. pp.15-19].</i>	2
15	<i>Rules and regulations of certification. Accreditation of certification bodies. Literature: 3.c.279-295; 4 .p.303-316. The task at the ISW is an environmentalistfor certification. [34d. c.297-318].</i>	2
16	<i>Quality management. Certification of environmental management systems. Supervision of product quality and quality systems. Literature: 3. pp.296-305. The task at the ISW is International Systems of Environmental Certification. [32d. p. 354-360].</i>	2
17	<i>Agreements on mutual recognition as a method of harmonization of requirements for the quality of objects. Literature:5.pp.306-320. The task at the ISW is International Systems of Environmental Certification. [32d. p. 354-360].</i>	2
18	<i>National standardization bodies abroad. International organizations in the field of accreditation. Literature:4.p.176-193, 317-325. The task at the ISW is international organizations for environmental certification. [32d. p. 386-391].</i>	2
	Just:	54

Practical classes

In the system of professional training of students in this discipline, practical classes occupy 25% of the classroom load. terminology, allow you to check knowledge, so this type of work is an important means of operational feedback. Practical classes should perform not only cognitive and educational functions, but also contribute to the growth of students as creative workers in the field of environmental protection.

The main objectives of the cycle of practical classes:

- help students systematize, consolidate and deepen theoretical knowledge in the field of modern principles of urban ecosystem formation;
- teach students techniques for solving practical problems, promote mastering the skills and abilities of performing calculations, graphic and other tasks;
- teach them to work with scientific and reference literature and regulatory documents;
- to form the ability to learn independently, that is, to master the methods, methods and techniques of self-learning, self-development and self-control.

No s/n	The name of the topic of the lesson and the list of main questions (list of didactic support, references to literature and tasks for the ISW)	Number of hours
1	Topic: Calculation of losses in case of pollution of the NPS Calculation of the amount of compensation for losses caused to the state as a result of excessive emissions of pollutants into the atmospheric air. Calculation of the amount of compensation for losses caused to the state as a result of violation of the legislation on the protection and rational use of water resources Literature: [2] Tasks on the ISW. Calculation of the amount of damage caused to the state as a result of unauthorized use of water. Determination of losses in case of exceeding the emission and the absence of instrumental control. [25d]	4
2	Topic: Calculating the amount of the nps pollution fee Calculation of emissions of pollutants into the air from vehicles. Calculation of the fee for environmental pollution. Literature: [2]pp. 70-78,132-137, [24d, 25d]	4

	<i>Tasks on the ISW. Determination of losses in the absence of permission to release substances into the atmosphere. Conditions for combining a group of emission sources. [16, 18]</i>	
3	Topic: Calculating the amount of the nps pollution fee <i>Determination of the amount of compensation for losses caused to the state as a result of unauthorized use of subsoil. Calculation of emissions of pollutants into the air from vehicles. Calculation of the fee for environmental pollution.</i> <i>Literature: [2] pp. 69 - 74</i> <i>Tasks on the ISW. Determination of losses in the absence of a permit for the release of substances into the atmosphere. Conditions for combining a group of emission sources.</i>	4
4	Topic: Calculation of the size of the damage, dachshunds. <i>Determining the amount of damage caused by pollution and clogging of land resources due to violation of environmental legislation. Calculation of the amount of damage caused to forestry. determining the amount of damage caused as a result of unauthorized occupation of land plots, use of land plots not for the intended purpose, removal of soil cover (fertile soil layer) without special permission.</i> <i>Literature: [2] pp.74-102</i> <i>Tasks on the ISW. Calculation of compensation for damage from pollution of agricultural land with oil. Dachshunds for calculating the amount of damage. [25d]</i>	4
5	<i>Modular control work</i>	2
	<i>Just</i>	18

6. Independent work of the student

Independent work takes 52 % of the time to study the credit module, including preparation for the test. The main task of independent work of students is to master scientific knowledge in areas that are not included in the list of lecture issues through personal search for information, the formation of an active interest in a creative approach in educational work. the latest approaches to monitoring compliance with the requirements of environmental legislation in the implementation of production activities.

No s/n	The name of the topic submitted for independent study	Number of hours of ISW
<i>Part I</i>		
<i>Section 1. State bodies of environmental control and inspection, inspections</i>		
1	<i>Get acquainted with the main legislative acts in various fields of environmental protection. To consider the competence of state bodies of local self-government in the field of environmental protection. [1d, 2d, 3d, 27d].</i> <i>The powers possessed by public inspectors for the protection of the NPS. To consider the forms of statistical reporting of economic objects for the protection of nps[1] art. 46-52</i>	5
<i>Section 2. Verification of enterprises and time standards for inspection</i>		
2	<i>Consider what legislative acts guide the state inspector in drawing up the protocol [5d]</i> <i>Consider what legislative acts guide the state inspector in drawing up the protocol [5d]</i>	5
<i>Section 3. Implementation of state control over the protection of lands, forests and other plant resources</i>		
3	<i>To characterize the criteria for rationing the quality of the environment in the field of air protection [13d, 28d].</i> <i>To characterize the requirements of waste management of medical institutions [29 d]</i>	4
4	<i>Analyze legal documents in the field of land protection [20 ò], [23 ò]</i> <i>Full-scale verification of compliance with the requirements of environmental legislation in the territories of nature reserves [1]art. 95-100</i> <i>Indicate the reasons for planning the shooting of wild animals [30d]</i>	4
<i>Part II</i>		
<i>Section 1. General principles of metrology, standardization and certification.</i>		
1	<i>Measurements in human life. Ecological certification. [34d. p.293-38; 35d.p. 5-10; 31d. C.11-23].</i>	4
<i>Section 2. Metrology in the ecological sphere</i>		
2	<i>Non-system units of physical quantities. The main characteristics of measuring instruments. Verification of measuring instruments. Measurement of electrical quantities. Devices for air sampling. Devices for water sampling. Devices for soil sampling. Participation of Ukraine in the work of international organizations [32d. p.57-60; 35d. C.14-24; 35d. s.24-37; 32d. C.65-70; 32d. C.92-98; 31d. C.97-104; 31d. C.36-45; 35d. C.248-258; 35d.s.502-51; 35d.s.492-502; 9.pp.162-189; 35d. p.513-515; 32d.p.363-372; 34d.p.337-357].</i>	10
<i>Section 3. Standardization in the field of ecology</i>		
3	<i>The need for standardization in ecology [34d.p.79-86; 32d.p.23-25]. Development of standardization in Ukraine [32d. p.19-25]. Fundamentals of environmental labeling [34d. p. 134-160; 32d. C.391-427]. International environmental standards. [32d. s. 19-25; 33d. pp.15-19].</i>	6
<i>Section 4. Certification as a means of ensuring the quality of life.</i>		

4	<i>Ecologist for certification. [34d. c.297-318]. International environmental certification systems. [32d. p. 354-360]. International organizations for environmental certification. [32d. p. 386-391].</i>	4
5	<i>Test paper on sections 1-3</i>	6
6	<i>Exam preparation</i>	30
	Just:	78

Policy and control

7. Policy of the discipline (educational component)

Rules for attending classes and behavior in the classroom

Students are obliged to take an active part in the educational process, not to be late for classes and not to miss them without a good reason, not to interfere with the teacher to conduct classes, not to be distracted by actions that are not related to the educational process.

Rules for assigning incentive and penalty points

Rules for assigning incentive and penalty points.

- incentive points can be awarded by the teacher solely for the performance of creative work in the discipline or additional completion of online specialized courses with the receipt of the appropriate certificate:

- <https://www.coursera.org/learn/environmental-law>. Introduction to Environmental Law and Police

- <https://www.coursera.org/learn/solid-waste-management>. Municipal solid Wastes Management in Developing Countries -

<https://www.coursera.org/learn/international-water-law> International Water Law.

But their amount cannot exceed 10 % of the rating scale.

-penalty points in the framework of the discipline are not provided.

Deadlines and Rescheduling Policy

In case of debts in the discipline or any force majeure circumstances, students should contact the teacher through the available (provided by the teacher) communication channels to solve problematic issues and agree on an algorithm of actions for working out.

Academic Integrity Policy

Plagiarism and other forms of dishonest work are unacceptable. Plagiarism includes the lack of links when using printed and electronic materials, quotes, opinions of other authors. Unacceptable hints and write-offs when writing tests, conducting classes; passing the test for another graduate student; copying materials protected by the copyright system without the permission of the author of the work.

The policy and principles of academic integrity are defined in Chapter 3 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". Read more: <https://kpi.ua/code>

Academic Conduct and Ethics Policy

Students should be tolerant, respect the opinions of others, formulate objections in the correct form, constructively maintain feedback in the classroom.

The norms of ethical behavior of students and employees are defined in Chapter 2 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". Read more: <https://kpi.ua/code>

8. Types of control and rating system for evaluating learning outcomes (RSO)

Distribution of study time by types of classes and tasks in the discipline in accordance with the working curriculum:

Semester	Study time		Distribution of study hours				Control measures		
	Loans	acad. H.	Lecture	Practical	Lab. Rob.	ISW	MCT	Ocd	Semester control
2	5	150	54	18	–	78	1	-	Exam

The student's rating on the discipline consists of points that he receives for:

According to the full-time form of education, it is proposed to introduce a rating system for assessing the success of students mastering educational material from the credit module. The student's rating from the credit module "Fundamentals of certification and statistics in ecology" consists of points received for:

1)work in practical classes;

2)surveys at lectures;

3)two tests;

4)answers to the exam.

Semester control is an exam.

The system of rating (weight) points and evaluation criteria

Rating points system and evaluation criteria:

1. Express control at lectures:

Weight score –4.

6 responses 4×6=24 points

Criteria for assessing students' knowledge:

Completeness and signs of response	Points
<i>Clear and complete answer to the question</i>	4

<i>The answer made some inaccuracies or errors</i>	3
<i>The answer does not contain the wording of terms, laws and formulas</i>	1... 2
<i>Answer not credited</i>	0

2. Modular control (R_m)

Weight score 10. The maximum number of points for all tests is 10 points \times 2 = 20 points. \times

Criteria for evaluating tests:

Completeness and signs of response	Points
<i>Clear and complete answer to the question</i>	10
<i>The answer made some inaccuracies or errors</i>	5... 9
<i>The answer does not contain the wording of terms, laws and formulas</i>	4... 1
<i>Answer not credited</i>	0

3. Practical work:

Weight score – 2. The maximum number of points for all practical work is equal to:

4 points \times 4 p/p = 16 points.

Criteria for assessing students' knowledge:

Completeness and signs of response	Points
<i>For active and creative work</i>	4
<i>Fruitful work</i>	3... 1
<i>Lack of work</i>	0

Calculation of the scale (R) of the rating:

The sum of the weight points of the control measures during the semester is:

$$R_c = 24 + 20 + 16 = 60 \text{ points.}$$

According to the results of educational work in the first 7 weeks, the "ideal student" should score 30 points. At the first certification (8th week), a student receives "enrolled" if his current rating is at least 20 points.

According to the results of educational work for 13 weeks of study, the "ideal student" should score 60 points. At the second certification (14th week), a student receives "enrolled" if his current rating is at least 40 points.

During the exam, students give answers to 4 questions, each of which is estimated at 10 points.

The maximum number of points is $4 \times 10 = 40$ points.

The component of the examination scale is 40% of R:

$$R_{ex} = 40 \text{ points.}$$

Thus, the rating assessment in the discipline is:

$$R = 60 + 40 = 100 \text{ points.}$$

Students who have received an F grade are not allowed to take the exam and must increase their rating.

A prerequisite for admission to the exam is the fulfillment of all ICRs.

Criteria for assessing students' knowledge at the exam:

Completeness and signs of response	Points
<i>Full answer to all questions</i>	10
<i>The answer made some inaccuracies</i>	8... 9
<i>This partial answer or in answers to questions and mistakes made</i>	6... 7
<i>This fuzzy answer: missing or made mistakes in formulas, reactions, terms and definitions</i>	4... 5
<i>Unsatisfactory answers to individual questions and the presence of significant errors on other questions are given</i>	1... 3
<i>Answer not credited</i>	0

Rating score from the exam:

$R = r_1 + r_2 + r_3 + r_4$	University scale
95... 100 points	Perfectly
85... 94 points	Very good
75... 84 points	Well
65... 74 points	Satisfactory
60... 64 points	Enough

<i>R < 60 points</i>	<i>Disappointing</i>
<i>If $r_c < 40$ points or other conditions for admission to the exam are not met</i>	<i>Not allowed</i>

9. Additional information on the discipline (educational component)

An approximate list of questions that are submitted for semester control

Part I

1. Cite refers to the central state environmental control authorities?
2. Bring Committees and Services among state environmental control bodies?
3. Specify the Departments, Inspections and Offices among the state environmental control bodies?
4. Explain what can be included in the general information about the State Environmental Inspectorates?
5. Specify what the State Environmental Inspectorate (main) controls?
6. Indicate what proposals are submitted to the Ministry of Environment by the State Environmental Inspectorate?
7. Explain what can be included in the general information about the Black Sea - Azov state environmental inspections?
8. Give the main tasks of the Black Sea - Azov State Environmental Inspectorates?
9. Explain in what meaning the terms are used: Inspection Report, object of inspection, state inspector?
10. Define the purpose of inspections of business entities and what assistance should their management provide to inspectors?
11. How should the inspection of the object begin?
12. Describe what the state inspector is obliged to consider during inspections of the object?
13. Indicate what the state inspector should do, received documents on the air protection activities of the enterprise?
14. Explain what is examined when checking the production units of the enterprise?
15. Determine what regulates the inventory and reporting on emissions of pollutants in the enterprise?
16. Highlight how the following terms are defined in the Instructions: release of a substance, inventory of emissions, emission power, source of air pollution, stationary source of air pollution, mobile source of air pollution, point source of emissions?
17. Highlight how the following terms are defined in the Instructions: linear source of emissions, planar source of emissions, organized emission, unorganized release, technological source of pollution, limiting standards for the formation of pollutants, concentration of pollutants, gas treatment plant?
18. Cite what is installed when checking the water consumption of the enterprise?
19. Cite what is revealed when checking the sanitary condition of the facility and potential sources of contamination of surface and groundwater?
20. Explain what regulates the control over the impact of livestock farms on water bodies?
21. Indicate the features of water pollution by livestock complexes?
22. Describe what are the methods of exercising state control over the use and protection of land and types of inspections?
23. Describe the procedure for establishing, calculating and paying the environmental pollution fee?
24. Indicate whether the objects of calculation of the fee are, what does it cope for and who can be the payers of the fee?
25. Justify what determines the values of the collection standards and how are they indexed?
26. Explain what regulates the determination of the amount of compensation for damages caused to the state as a result of violation of water legislation?
27. Cite in what cases are the damages caused to the state as a result of violation of the requirements of water legislation reimbursed?

Part II

1. Explain the relationship of metrology, standardization and certification
2. Describe the verification of measuring instruments
3. Explain from the general principles of international standardization
4. To characterize the essence and tasks of metrology
5. To characterize the state system for ensuring the unity of measurements
6. Explain the methods of analysis of natural waters.
7. Explain the features of standardization in developed European countries
8. To characterize the importance of standardization
9. Describe ecoupons of units of physical quantities
10. Characterize the concentration of microcomponents and the elimination of substances that interfere with the analysis of water samples.
11. Describe the development of international standards.
12. Explain the essence and purpose of certification activities
13. Describe withaonodative and formative ensuring the unity of measurements
14. Describe theontrouduction of soil quality.
15. Explain the system of standards for environmental protection and quality of human life
16. Explain therenovation and development of metrology, standardization, certification
17. Describe metodological principles for measuring non-electric quantities
18. Explain soil sampling.
19. Characterize thetandardization of agricultural products
20. Describe about thebasic units of physical quantities
21. Explain the measurement of the chemical composition and properties of substances
22. Explain the methods of soil analysis.
23. Describe andinform about the compliance of goods with the established requirements

24. Describe the international systems in units of measurement of physical quantities
25. Explain the measurement of geometric dimensions
26. Characterize the preparation and analysis of soil samples.
27. Explain ecologic labeling
28. Explain the types, methods and means of measurement
29. Describe the preparation for measurements
30. Characterize the normation of heavy metal content
31. Describe the strich coding.
32. Explain measurement methods
33. Describe the main characteristics in environmental analysis techniques
34. Explain the usefulness of methods for measuring the content of heavy metals and radionuclides.
35. Describe the arching of food additives.
36. Explain the measurements
37. Describe the scales of processing the measurement results
38. To characterize the main measuring equipment designed to measure the content of heavy metals and radionuclides.
39. Explain the classification of food additives.
40. Describe the classification of measuring instruments
41. Describe the parameters of atmospheric air quality
42. Explain the main measuring equipment to measure radiation levels.
43. Explain the content of regulatory documents.
44. Parameters of measuring instruments
45. Features of atmospheric air sampling
46. Explain the statistical processing of measurement results.
47. Describe the structure of state bodies as a means of ensuring the quality of life.
48. Explain the point measurement
49. Explain the measuring the concentration of dust in the atmosphere
50. Describe international cooperation in the field of metrology.
51. Explain the system of environmental standards in Ukraine.
52. To characterize the state system of industrial devices and automation tools
53. Characterize bioindication.
54. Describe the directions of metrological activity of Derzhspozhyvstandard in Ukraine and its cooperation with international organizations.
55. Explain the general principles of certification
56. Describe measurement errors in detail
57. Describe the cost of controlling water quality.
58. Describe the theoretical and methodological foundations of standardization.
59. Explain the norms and certification rules

The work program of the discipline (syllabus):

Compiled by Prof., Doctor of Technical Sciences, Radovenchyk V.M., Assoc.Prof., Ph.D., Nosachova Yu.V.

Approved by the Department ___E and TPP ___ (Protocol No. 14 dated 8.06.2022)

Agreed by the methodical commission of the IHF (protocol No 10 dated 24.06.2022)