



Environmental Protection Organization and Management
Work program of the discipline (Syllabus)

Requisites of the discipline

Level of higher education	<i>First (bachelor's)</i>
Field of expertise	<i>10 Natural sciences</i>
Speciality	<i>101 Ecology</i>
Educational program	<i>OPP Environmental safety</i>
Discipline status	<i>Regulatory</i>
Form of education	<i>Part-time mode of study</i>
Year of preparation, semester	<i>4th year, autumn and semester</i>
Scope of discipline	<i>4 (120)</i>
Semester Control/ Control Measures	<i>Exam</i>
Schedule of classes	<i>8 hours of lectures and 4 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/trus-inna-mikolajivna.html Practical/Seminar: https://eco-paper.kpi.ua/pro-kafedru/vykladachi/trus-inna-mikolajivna.html
Course placement	https://do.ipk.kpi.ua/course/view.php?id=2597

The program of the discipline

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

The implementation of not sufficiently sound recommendations for the restructuring of society led to a financial crisis. In addition, there is an environmental crisis due to irrational environmental management and deep negative changes in the socio-economic and environmental development of the country. Today, among European countries, Ukraine has one of the highest integral indicators of anthropogenic load on the environment. Inconsistency in the actions of state and local authorities, the unsatisfactory state of the state environmental monitoring system, the inability of the current ecological and economic mechanism of environmental management to arouse the interest of business entities in reducing the eco-destructive impact led to an economic and environmental crisis in the field of environmental protection.

In order to effectively regulate the impact of human production and economic activity on the environment, it is necessary to ensure the organization of the environmental management process, which includes reorientation from obtaining short-term economic benefits to fulfilling long-term obligations in the field of managing environmental protection processes, ensuring the environmental safety of the enterprise, which will have financial benefits for society, because the elimination of the consequences environmental degradation is much more expensive than eliminating the causes of degradation.

The adoption of the Law "On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine until 2030" testifies to the awareness of the need to restructure environmental policy at all levels and further introduce an ecosystem approach into sectoral policy and improve the integrated environmental management system.

Consolidation of changes in the public administration system by reforming the system of state environmental management, implementation of European environmental standards and norms,

improvement of environmental accounting and control systems, introduction of financial and economic mechanisms for stimulating environmentally oriented structural transformations in the economy, introduction of mechanisms to stimulate enterprises to energy efficiency, introduction of e-government, dissemination of environmental knowledge, increase environmental consciousness of society, informatization of the sphere of environmental protection and environmental management will stabilize the ecological situation.

The development of the environmental management system will be facilitated by the introduction of international standards of environmental management systems in enterprises and companies.

The subject of the discipline "Environmental Protection Organization and Management" is the implementation of approaches that will ensure the introduction of an ecosystem approach to sectoral policy and improvement of the integrated environmental management system, the introduction of international standards of environmental management systems at enterprises and companies, which will help prevent man-made and environmental disasters and improve the state of the environment.

The purpose of the discipline "Environmental Protection Organization and Management"

The purpose of studying the discipline "Environmental Protection Organization and Management" is to obtain by future specialists basic knowledge about the modern understanding of systemic theoretical and methodological ideas about environmental management in the context of global trends in the greening of human life, preparation for the practical application of this knowledge in state institutions and enterprises of regional and local levels. Requires the formation of students' competencies:

- understanding of the main theoretical provisions, concepts and principles of mathematical and socio-economic sciences;
- the ability to use basic principles and components of environmental management;
- the ability to participate in the development of a management system and handling of production and consumption waste;
- the ability to inform the public about the state of environmental safety and balanced nature management;
- the ability to master international and domestic experience in solving regional and cross-border environmental problems;
- the ability to participate in the management of environmental actions and/or environmental projects;
- the ability to develop projects for calculating maximum permissible discharges and emissions, to monitor compliance with MPD, MPE.

According to the requirements of the program of the discipline "**Environmental Protection Organization and Management**", students after mastering it must demonstrate the following programmatic learning outcomes:

- to demonstrate an understanding of the basic principles of management of environmental actions and / or environmental projects;
- to understand the basic environmental laws, rules and principles of environmental protection and nature management;
- to use the management principles on which the environmental safety system is based;
- to identify the factors that determine the formation of landscape and biological diversity;
- to solve problems in the field of environmental protection using generally accepted and / or standard approaches and international and national experience;
- to demonstrate skills in assessing unforeseen environmental problems and making informed choices of their solving;
- to be able to predict the impact of technological processes and industries on the environment;
- to participate in the development and implementation of projects aimed at optimal management and treatment of industrial and municipal waste;
- to be able to form effective communication strategies in order to convey ideas, problems, solutions and personal experience in the field of ecology;
- to be able to communicate the results of activities to a professional audience and the general public, to make presentations and messages;

- to be able to explain the social, economic and political consequences of implementing environmental projects;
- to choose the optimal strategy for holding public hearings on the problems and formation of the territories of the nature reserve fund and the ecological network;
- to be able to form requests and determine actions that ensure compliance with the norms and requirements of environmental legislation;
- to participate in the development of projects and practical recommendations for environmental protection;
- to demonstrate skills in implementing environmental measures and projects.

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

The study of the discipline "**Environmental Protection Organization and Management**" is based on the principles of integration of various knowledge gained by students during the three years of undergraduate studies in the study of natural and engineering-technical disciplines: "Environmental Law and Reserve management and Studies".

The discipline "**Environmental Protection Organization and Management**" ensures the implementation of a bachelor's Thesis.

3. Contents

Section 1. Normative and methodological bases of environmental management

Topic 1. Implementation of the principles of the state environmental policy in Ukraine

Topic 2. Development of environmental management

Section 2. Environmental management systems

Topic 3. General provisions of the state system of environmental management

Topic 4. General characteristics of the corporate environmental management system.

Topic 5. The system of public environmental management and local environmental self-government

Section 3. Special functions of state environmental management

Topic 6. Application of administrative tools for the implementation of state environmental policy

Topic 7. Environmental audit

Topic 8. Legal liability for violation of environmental law

Section 4. Implementation of an ecosystem approach to sectoral policy and improvement of the integrated environmental management system

Topic 9. Environmental management as a prerequisite for sustainable development

Topic 10. Management in the field of protection of natural resource potential of Ukraine

Section 5. Economic mechanisms of environmental management

Topic 11. Payment for natural resources and sources of their formation

Topic 12. Determining the amount of payment and collection of payments for environmental pollution in Ukraine

Topic 13. Economic, environmental and social effectiveness of environmental measures

Section 6. Basic principles of international experience in environmental safety management in the context of balanced development

Topic 14. Improving the efficiency of public administration in Ukraine, taking into account international experience

Topic 15. Environmental education

4. Training materials and resources

Basic literature

1. *Environmental aspects of environmental quality management: textbook / I.M. Trus, Ya.V. Radovenchyk, M.D. Gomelya. – Kyiv: Condor Publishing House, 2020. – 208 p.*
2. *Organization and management of environmental activities: textbook. persons. / N. M. Samoilenko, D. V. Raiko, V. I. Averchenko. – Kharkiv: NTU "KhPI", Publishing House "Leader", 2018. – 174 p.*
3. *From the ACON of Ukraine "On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the period up to 2030"*
<https://zakon.rada.gov.ua/laws/show/2697-19#Text>
4. *Law of Ukraine "On Environmental Protection"*
<https://zakon.rada.gov.ua/laws/show/1264-12#Text>
5. *On the protection of atmospheric air*
<https://zakon.rada.gov.ua/laws/show/2707-12#Text>
6. *Water Code of Ukraine*
<https://zakon.rada.gov.ua/laws/show/213/95-%D0%B2%D1%80#Text>
7. *Law of Ukraine "On Waste"*
<https://zakon.rada.gov.ua/laws/show/187/98-%D0%B2%D1%80#Text>
8. *Subsoil Code of Ukraine*
<https://zakon.rada.gov.ua/laws/show/132/94-%D0%B2%D1%80#Text>
9. *The Land Code of Ukraine*
<https://zakon.rada.gov.ua/laws/show/2768-14#Text>
10. *Convention on Biological Diversity of 1992*
https://zakon.rada.gov.ua/laws/show/995_030#Text
11. *Forest Code of Ukraine*
<https://zakon.rada.gov.ua/laws/show/3852-12#Text>
12. *Law of Ukraine "On the Nature Reserve Fund of Ukraine"*
<https://zakon.rada.gov.ua/laws/show/2456-12#Text>
13. *Tax Code of Ukraine of 01.01.2022*
<https://zakon.rada.gov.ua/laws/show/2755-17#Text>

Further reading

1. *Law of Ukraine "On State Control over Land Use and Protection"*
<https://zakon.rada.gov.ua/laws/show/963-15#Text>
2. *Law of Ukraine "On the National Toxic Waste Management Program"*
<https://zakon.rada.gov.ua/laws/show/1947-14#Text>
3. *Law of Ukraine "On Radioactive Waste Management"*
<https://zakon.rada.gov.ua/laws/show/255/95-%D0%B2%D1%80#Text>
4. *Decree of the Cabinet of Ministers of Ukraine dated November 8, 2017 No. 820 "On approval of the National Waste Management Strategy in Ukraine until 2030"*
<https://zakon.rada.gov.ua/laws/show/820-2017-%D1%80#Text>
5. *Regulations on the State Agency of Water Resources of Ukraine, approved by the Resolution of the Cabinet of Ministers of Ukraine dated August 20, 2014 No. 393*
<https://zakon.rada.gov.ua/laws/show/393-2014-%D0%BF#n8>
6. *Regulations on the State Forest Resources Agency of Ukraine, approved by the Resolution of the Cabinet of Ministers of Ukraine dated October 8, 2014 No. 521*
<https://zakon.rada.gov.ua/laws/show/521-2014-%D0%BF#n8>
7. *Regulations on the State Agency of Ukraine on Exclusion Zone Management, approved by the Resolution of the Cabinet of Ministers of Ukraine dated October 22, 2014 No. 564*
<https://zakon.rada.gov.ua/laws/show/564-2014-%D0%BF#n8>
8. *Regulations on the State Service of Geology and Subsoil of Ukraine, approved by the Resolution of the Cabinet of Ministers of Ukraine dated December 30, 2015 No. 1174*
<https://zakon.rada.gov.ua/laws/show/1174-2015-%D0%BF#n8>
9. *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*

Information resources on the Internet

1. Ministry of Environmental Protection and Natural Resources of Ukraine - <https://mepr.gov.ua/>

Educational content

5. Methods of mastering the discipline (educational component)

Lecture classes

Lectures are aimed at:

- providing modern, holistic, interdependent knowledge in the discipline "Organization and management of environmental activities", the level of which is determined by the target setting for each specific topic;
- ensuring the creative work of students together with the teacher during the lecture;
- education of students' professional and business qualities and the development of their independent creative thinking;
- formation of students' necessary interest and provision of direction for independent work;
- determining the effectiveness of the implementation of national environmental policy, forecasting prospects and directions of development for the coming years;
- reflection of the methodical processing of the material for its better perception (highlighting the main provisions, conclusions, recommendations, clear and adequate to their formulations);
- use for demonstration of visual materials, combination, if possible with the demonstration of results and samples;
- teaching research materials in a clear and high-quality language in compliance with structural and logical connections, clarification of all newly introduced terms and concepts;
- availability of the information provided for perception by this audience.

No salary	The title of the lecture topic and the list of main issues (list of didactic means, references to literature and tasks on the CPC)	Hours
Section 1. Normative and methodological bases of environmental management		
1	<p>Topic 1. Implementation of the principles of state environmental policy in Ukraine Existing problems and current state of environment in Ukraine. Purpose, principles, principles and instruments of state environmental policy. Strategic goals and objectives of the state environmental policy. Література: [1] с. 7-11; [2] с. 7-49; 3. Tasks on the CPC. Management principles and functions. Management process procedures.</p>	0,5
2	<p>Topic 2. Development of environmental management Stages of development of environmental management in Ukraine and abroad. Environmental Management Requirements Література: [1] с. 14-23; [2] в. 49-52. Tasks on the CPC. Mechanisms of environmental management. The place and role of management decisions in the process of functioning of the enterprise.</p>	0,5
Section 2. Environmental Management Systems		
3	<p>Topic 3. General provisions of the state environmental management system Functions and hierarchy of the state system topics of environmental management. Public administration bodies. Література: [2] с. 56-89. Tasks on the CPC. Levels of environmental management.</p>	0,5
4	<p>Topic 4. General characteristics of the corporate environmental management system.</p>	0,5

	<p><i>Fundamental approaches, basic principles of creating a corporate governance system. The essence and mechanisms of corporate governance. Charter of the International Chamber of Commerce, its principles. Environmental aspects of requirements for managerial personnel.</i></p> <p><i>Література: [2] с. 94-136.</i></p> <p><i>Tasks for independent work: Standard system requirements put forward to the environmental policy of corporations.</i></p>	
5	<p>Topic 5. System of public environmental management and local ecological self-government</p> <p><i>The role and functions of the public environmental in the board. Aarhus Convention. Forms of public participation. Functions of public environmental management. The role of non-governmental organizations in the process of implementing the principles of balanced development at all levels. Forms of public participation in environmental activities. Means and mechanisms of public involvement in environmental activities. Environmental aspects and functions of local self-government. Strategic tasks of local authorities.</i></p> <p><i>Література: [2] с. 137-142.</i></p> <p><i>Tasks on the CPC. Basic principles of local environmental policy. Solving local environmental programs in Central and Eastern Europe. Local environmental audit programs.</i></p>	0,5
Section 3. Special functions of state environmental management		
6	<p>Topic 6. Application of administrative tools for the implementation of state environmental policy</p> <p><i>Environmental impact assessment. The current state of the process of introducing environmental certification in Ukraine. Basic principles and benefits of environmental certification. The purpose and principles of environmental licensing. Environmental certification and insurance. Environmental monitoring. Environmental quality standards. Methods for determining environmental risk. Purpose, objectives, features of the development of environmental impact assessment materials. Evaluate and select environmental characteristics. Product life cycle. Eco labeling. Matrix selection criteria for environmental cleanliness. Environmental marketing, engineering. The challenge of environmental engineering is to create and implement prophetic pro communities. Objects and subjects of leasing. The scheme of implementation of the classic leasing operation. Environmental management.</i></p> <p><i>Література: [1] с. 110-157; 164-202; [2] с. 43-46</i></p> <p><i>Tasks on the CPC. Environmental regulation. The procedure for development and approval of standards for maximum permissible emissions and discharges of pollutants. The procedure for the development of environmental impact assessment materials. Assess the environmental characteristics for the environment, control system, production systems. Ecological modernization of production. Types of wear. Voluntary and compulsory certification. Maximum permissible concentration, maximum permissible discharge and maximum permissible load.</i></p>	1
7	<p>Topic 7. Environmental audit</p> <p><i>Objectives and benefits of conducting an environmental audit. Objects and subjects of audit. Audit conditions. Eco-audit in Ukraine. Drawing up an auditor's report.</i></p> <p><i>Література: [1] с. 157-163; [2] с. 43-46</i></p> <p><i>Tasks on the CPC. To give a system of objectives of a comprehensive express eco-audit of the enterprise.</i></p>	0,5
8	<p>Topic 8. Legal liability for violation of environmental law</p> <p><i>Classification of environmental offenses. Disciplinary, civil (property), criminal, administrative types of liability</i></p> <p><i>Література: [2] с. 43-46; [4].</i></p> <p><i>Tasks on the CPC. Types of disciplinary action</i></p>	0,5

Section 4. Implementation of an ecosystem approach in sectoral policy and improvement of the integrated environmental management system		
9	<p>Topic 9. Environmental management as a prerequisite for sustainable development</p> <p>Atmospheric air quality management. Management in the field of water protection. Protection of lands and soils. Waste management. State administration in the field of protection, protection and restoration of forests. Nadra.</p> <p>Література: [1] с. 32-33; [3].</p> <p>Завдання на ЦПК. Стан поверхні та підземних вод в Україні. Стан атмосферного повітря в Україні. Стан ґрунтів та земельних ресурсів України. Аналіз світової та національної практики впровадження інтегрованого управління водними ресурсами.</p>	0,5
10	<p>Topic 10. Department in the field of protection of natural resource potential of Ukraine</p> <p>The ecological network of Ukraine is a modern concept of conservation of biological and landscape diversity. Climate change. Emergencies. Exclusion zone and zone of unconditional(mandatory) resettlement. Environmental problems of Donbass. Biosafety.</p> <p>References: [3].</p> <p>Tasks on the CPC. El Niño and La Niña phenomena as phenomena of global climate anomaly</p>	0,5
Section 5. Economic mechanisms of environmental management		
11	<p>Topic 11. Payment for natural resources and sources of their education</p> <p>Methods of economic management of environmental management.</p> <p>Payments for resources, their types and standards. Rent for the use of subsoil for mining. Rent for the use of subsoil for purposes not related to the extraction of minerals. Rent for the use of the radio frequency resource of Ukraine. Rent for special use of water. Rent for special use of forest resources. Payment for land resources.</p> <p>Література: [1] с. 89-101.</p> <p>Завдання на ЦПК. Стандарти оплати за використання природних ресурсів</p>	0,5
12	<p>Topic 12. In determining the amount of payment and collection of payments for pollution of the environment of Ukraine</p> <p>Payments for pollution, their types and criteria for accrual. Determination of the amount of payment for emissions of pollutants into the atmosphere by stationary and neutral sources of pollution. Amounts of payments for discharges into surface waters, territorial and internal sea waters and underground horizons. Calculation of the amount of payments for waste disposal in the environment.</p> <p>Література: [1] с. 88-101.</p> <p>Завдання на ЦПК. Знайомство з методологією визначення розміру шкоди, заваної ґрунтам внаслідок надзвичайних та/або озброєних агресій та ворожб під час воєнного стану</p>	0,5
13	<p>Topic 13. Economic, environmental and social efficiency of environmental measures</p> <p>Types of calculations of economic losses: actual, possible, prevented, liquidated, potential losses. Social, environmental and economic results of environmental measures. Factors influencing the economic efficiency of environmental measures.</p> <p>Література: [1] с. 102-106.</p> <p>Завдання на ЦПК. Чистий економічний ефект. Загальна (абсолютна) економічна ефективність капітальних інвестицій.</p>	0,5
Section 6. Basic principles of international experience in environmental safety management in the context of balanced development		
14	<p>Topic 14. Improving the efficiency of public administration in Ukraine taking into account international experience</p>	0,5

	<p><i>United Nations Development Programme. Cooperation of Ukraine with international environmental organizations. Management approaches to ensuring the rational use of natural resources from the standpoint of analyzing foreign management practices in this area.</i></p> <p><i>Література: [1] с. 23-32; [3] .</i></p> <p><i>Tasks on the CPC. Modern public funds and organizations involved in the protection and restoration of the environment.</i></p>	
15	<p>Topic 15. Environmental education</p> <p><i>Environmental education of the population is an important component of the international environmental policy of countries. Development and formation of formal and non-formal education at the Department of Ecology and Technology of Plant Polymers KPI. Igor Sikorsky.</i></p> <p><i>Література: [2] с. 43-46.</i></p> <p><i>Tasks on the CPC. Environmental education in developed countries.</i></p>	0,5
	Just	8

Practical exercises

In the system of professional training of students in this discipline, practical classes occupy 33.3% of the classroom load. Practical classes include topics that cover a wide range of issues. They allow a better understanding of lecture material, master the methodology for assessing economic losses for environmental pollution, find out the impact of individual groups of pollutants on the environment and assess the degree of environmental risks, form an idea of environmental management systems and relevant mechanisms for its implementation.

The content of these classes and the methods of their conduct should ensure the development of the creative activity of the individual. They develop scientific thinking and the ability to use special terminology, allow you to test 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 series of practical classes:

- *help students systematize, consolidate and deepen theoretical knowledge in the field of organization and management of environmental activities;*
- *teach students techniques for solving practical problems,*
- *promote the mastery of skills and abilities to perform calculations, graphic and other tasks;*
- *teach them to work with scientific and reference literature and diagrams;*
- *to form the ability to learn independently, that is, to master the methods, methods and techniques of self-study , self-development and self-control.*

No salary	The title of the topic of the practical lesson and the list of main issues (list of didactic support, references to literature and tasks on the CPC)	Hours
1	<p>State administration in the field of use and protection of atmospheric air</p> <p>State administration in the field of use and protection of water and reproduction of water resources</p> <p><i>Law of Ukraine "On Atmospheric Air Protection". Atmospheric air management in Ukraine. Measures to reduce air pollution. State accounting and monitoring in the field of atmospheric air protection. Purpose, tasks of environmental management in the field of atmospheric air. Standards regulating atmospheric air management in Ukraine. Characteristics of sources of emissions into the air. Air pollution by motor transport in Ukraine. Offenses in the field of air protection.</i></p> <p><i>The Water Code of Ukraine and the Water Code are a framework directivesa EU (Directive 2000/60/EC). Water Fund of Ukraine. Classification of bodies that manage the use and protection of water. Competence of public administration bodies in the field of water use and protection. Control over the use and protection of water and</i></p>	0,5

	<p>reproduction of water resources. Adaptation of Ukrainian legislation in the field of water protection to European legislation. Economic regulation of rational use and protection of water and reproduction of water resources. Rationing in the field of use and protection of water and reproduction of water resources. Responsibility for violation of water legislation</p> <p>References: 1 [32-48, 49-69], 5, 6.</p> <p>Tasks for independent work: The current state of atmospheric air in Kyiv and determination of sources of its pollution. Monitoring of the State Hydrometeorological Service of Ukraine.</p> <p>The current state of water bodies of the hydrosphere. Territorial distribution of water resources of Ukraine. Forecast resources of fresh groundwater of Ukraine.</p>	
2	<p>State administration in the field of waste management State administration in the field of use and protection of mineral resources</p> <p>Law of Ukraine "On Waste". State Waste Management Program in Ukraine. The main legislative and regulatory documents that regulate waste management. Basic principles of state policy in the field of waste management. Directions of solid waste management. Municipal solid waste management. Integration into the market from EU moves and the European waste management system.</p> <p>Subsoil Code. Legislative framework of mineral resources management in Ukraine. Public administration bodies in the field of mineral resources management. Public administration bodies in the sphere of use of natural resources. Land Code of Ukraine. General characteristics of land resources of Ukraine. The purpose of land use management in the exploration and development of mineral deposits. Planning of ways, means and objects of land use management in Ukraine. Characteristics of the land fund of Ukraine. Competence of different branches of power in the field of environmental management in agriculture. Economic mechanism of agricultural management. Bodies of state management of environmental activities in agriculture of Ukraine. State control in the field of use and protection of agricultural land.</p> <p>Література: 1 [69-78, 79-89], 7, 8, 9.</p> <p>Tasks for independent work: Waste as a base of secondary raw materials for industry. Extended producer responsibility. Zero Waste – Refuse, Reduce, Reuse, Recycle, Rot</p> <p>Mineral resource base of Ukraine and provision of mineral resources for use. Uranium ore mining and processing processes as the main source of radioactive waste. The current state of land resources in Kyiv and determination of sources of their pollution. Rights and obligations of users of agricultural objects. Biofarming.</p>	0,5
3	<p>State administration in the field of use and protection of flora and fauna State regulation and management in the field of protection and use of territories and objects of nature reserve and forest funds of Ukraine State Administration of Health Care of Ukraine</p> <p>State control in the field of protection, use and reproduction of flora Plant resources of Ukraine. Characteristics of biodiversity in Ukraine. Natural zones of Ukraine. Characteristics of representatives of taxa in Ukraine. Current maximum indicators of biodiversity. Negative anthropogenic impact on biodiversity in Ukraine. Forecast, growth of "red lists" in Ukraine. Law of Ukraine "On Fauna". Priority directions of management in the field of animal diversity conservation. Recommendations for practical actions to increase biodiversity in Ukraine. The main factors of the current decline in biodiversity sustainability within Ukraine. State control in the field of protection, use and reproduction of wildlife</p> <p>Law of Ukraine "On the Nature Reserve Fund of Ukraine". Structure and functions of public administration in the field of nature reserve fund. Specially authorized bodies in the field of nature reserves, the rights of citizens and public organizations. Legislative acts aimed at solving the problems of conservation of biological and landscape diversity. Reserves and national nature parks of Ukraine. The main natural regions of the econet. Forest Code of Ukraine. Law of Ukraine "On environmental protection".</p>	0,5

	<p><i>Competences of the Verkhovna Rada of Ukraine, regional, district and city Councils of People's Deputies in the field of regulation of forest relations</i></p> <p><i>Regulatory laws in the field of health. Ministries responsible for environmental and health issues. Directions of policy of rehabilitation of the population of Ukraine. Financial and economic mechanism of state regulation of health care. Ways to improve state policy and public administration of the domestic medical industry. Comparative analysis of health policy of the World Health Organization, the European Union and Ukraine.</i></p> <p><i>References: Листопамыпа: 3, 10., 11, 12.</i></p> <p><i>Tasks for independent work: Management in the field of conservation of plant and animal diversity of Ukraine at the regional level (on the example of a specific region).</i></p> <p><i>Tasks for independent work: Public administration in the field of use and protection of the nature reserve fund at the regional level (on the example of a specific region).</i></p> <p><i>Tasks for independent work: A measure of health assessment.</i></p>	
4	<p><i>Economic methods of environmental management</i></p> <p><i>International experience in environmental management</i></p> <p><i>Economic methods of management of rational nature management and their types. Economic mechanism of environmental regulation in Ukraine. Payments for resources, their types and standards. The main directions of improving resource taxation. Calculation of payments for environmental pollution, their types and criteria for accrual</i></p> <p><i>International programs in the field of environmental protection and environmental management. Environmental policy of developed foreign countries. Specificity of foreign environmental legislation and mechanism of its validity. International environmental cooperation. Participation of Ukraine in international cooperation in the field of environmental protection</i></p> <p><i>References: 1 [89-106], 3, 13.</i></p> <p><i>Tasks for independent work: Identify the main shortcomings in the mechanism of collection of resource payments</i></p> <p><i>International experience in river basin management. International principles of waste management.</i></p> <p><i>Modular test paper (1 hour)</i></p>	0,5 1
	Just	4

Providing program results by the components of the educational component

<i>Program result</i>	<i>Lecture classes</i>	<i>Practical and laboratory classes, individual tasks</i>
<i>Demonstrate an understanding of the basic principles of managing environmental actions and/or environmental projects.</i>	<i><u>Topic 1.</u> Implementation of the principles of state environmental policy in Ukraine</i>	
<i>It is necessary to understand the basic environmental laws, rules and principles of environmental protection and nature management.</i>	<i><u>Topic 2.</u> Development of environmental management</i>	
<i>In use the management principles on which the environmental safety system is based.</i>	<p><i><u>Topic 3.</u> General provisions of the state environmental management system</i></p> <p><i><u>Topic 4.</u> General characteristics of the corporate environmental management system.</i></p>	

<i>Identify the factors determining the formation of landscape and biological diversity.</i>		<i><u>Inservice Lesson 6.</u> State regulation and management in the field of protection and use of territories and objects of nature reserve and forest funds of Ukraine</i>
<i>To link problems in the field of environmental protection with the use of generally accepted and / or standard approaches and international and domestic experience.</i>	<i><u>Topic 14.</u> Improving the efficiency of public administration in Ukraine taking into account international experience</i>	
<i> Demonstrate skills in assessing unpredictable environmental problems and making deliberate choices about how to solve them.</i>	<i><u>Topic 6.</u> Application of administrative tools for the implementation of state environmental policy</i>	
<i>Initiate predict the impact of technological processes and production on the environment.</i>	<i><u>Topic 7.</u> Environmental audit</i>	
<i>Participate in the development and implementation of projects aimed at optimal management and management of industrial and municipal waste.</i>	<i><u>Topic 9.</u> Environmental management as a prerequisite for sustainable development <u>Topic 10.</u> Department in the field of protection of natural resource potential of Ukraine</i>	<i><u>Inservice Lesson 3.</u> State administration in the field of waste management</i>
<i>To form effective communication strategies in order to convey ideas, problems, solutions and their own experience in the field of ecology.</i>		<i><u>Inservice Lesson 9.</u> International experience in environmental management</i>
<i>To communicate the results of activities to the professional audience and the general public, to make presentations and messages.</i>		<i><u>Inservice Lesson 7.</u> State Administration of Health Care of Ukraine</i>
<i>Initiate explain the social, economic and political consequences of implementing environmental projects.</i>	<i><u>Topic 12.</u> Determination of the amount of payment and collection of payments for environmental pollution of Ukraine <u>Topic 13.</u> Economic, environmental and social efficiency of environmental measures</i>	
<i>To choose the optimal strategy for holding public hearings on the problems and formation of territories of the nature reserve fund and ecological network.</i>	<i><u>Topic 5.</u> The system of public environmental management and local ecological self-government</i>	
<i>To form requests and determine actions that ensure compliance with the norms and requirements of environmental legislation.</i>		<i><u>Inservice Lesson 1.</u> State administration in the field of use and protection of atmospheric air</i>

		<i>Inservice Lesson 2. State administration in the field of use and protection of water and reproduction of water resources</i>
<i>BParticipate in the development of projects and practical recommendations for environmental conservation.</i>		<i>Inservice Lesson 5. State administration in the field of use and protection of flora and fauna Inservice Lesson 6. State regulation and management in the field of protection and use of territories and objects of nature reserve and forest funds of Ukraine</i>
<i>Ddemonstrate skills in implementing environmental measures and projects.</i>		<i>Inservice Lesson 8. Economic methods of environmental management Execution of RGR</i>

6. Independent work of a student / graduate student

Independent work takes 55% of the time studying the credit module, including preparation for the exam. The main task of independent work of students is the mastery of 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 the creative approach in educational work. In the process of independent work within the educational component, the student must learn to deeply analyze the issues submitted for consideration, process it and come to their own reasonable conclusions.

<i>No salary</i>	<i>The name of the topic submitted for independent study</i>	<i>Number of hours CPC</i>
Section 1. Normative and methodological bases of environmental management		
<i>1</i>	<i>Topic 1. Implementation of the principles of state environmental policy in Ukraine</i> <i>The principle of careful intervention. The principle of naturalness. Hierarchies of mixed systems. general problems of harmonization of interaction between society and nature. economic mechanism of the Law of Ukraine "On Environmental Protection". modern public funds and organizations involved in the protection and restoration of the environment. Література: [1] с. 7-11; [2] с. 7-49; 3.</i>	<i>4</i>
<i>2</i>	<i>Topic 2. Development of environmental management</i> <i>Standard model of environmental management and stages of its implementation. System of regulatory regulation of environmental management. stages of implementation of managerial innovations. "Hard" and "soft" control mode. Література: [1] с. 14-23; [2] в. 49-52.</i>	<i>4</i>
Section 2. Environmental Management Systems		
<i>3</i>	<i>Topic 3. General provisions of the state environmental management system</i> <i>Subjects of macroecological management. Subjects of microecological management. Levels of environmental management. Література: [2] с. 56-89.</i>	<i>4</i>
<i>4</i>	<i>Topic 4. General characteristics of the corporate environmental management system.</i> <i>Evaluation of the effectiveness of corporate governance. Motivation of staff in management. Література: [2] с. 94-136.</i>	<i>4</i>

5	<p>Topic 5. System of public environmental management and local ecological self-government Environmental rights and obligations of citizens in the field of public environmental management. Local agenda for the XXI century. Improving the management of settlements. Література: [2] с. 137-142.</p>	4
<p>Section 3. Special functions of state environmental management</p>		
6	<p>Topic 6. Application of administrative tools for the implementation of state environmental policy Ecomanagement system in Ukraine. The main factors in the formation of the company's management culture. The purpose and principles of environmental licensing and certification. Possibilities of environmental insurance in Ukraine. Corporate culture. Література: [1] с. 110-157; 164-202; [2] с. 43-46</p>	8
7	<p>Topic 7. Environmental audit Drawing up an auditor's report. Certification of eco-auditors. Eco-audit in the modern economy of Ukraine. Література: [1] с. 157-163; [2] с. 43-46</p>	4
8	<p>Topic 8. Legal liability for violation of environmental law. Financial liability for violation of environmental legislation. The concept and features of environmental and legal responsibility for violation of environmental legislation. The concept of economic and legal liability for environmental offenses Література: [2] с. 43-46; [4].</p>	4
<p>Section 4. Implementation of an ecosystem approach in sectoral policy and improvement of the integrated environmental management system</p>		
9	<p>Topic 9. Environmental management as a prerequisite for sustainable development The right of general water use. The right of special water use. Control in the field of land use and protection. Література: [1] с. 32-33; [3].</p>	4
10	<p>Topic 10. Department in the field of protection of natural resource potential of Ukraine Public administration in the field of formation, preservation and use of ecological network of Ukraine References: [3].</p>	4
<p>Section 5. Economic mechanisms of environmental management</p>		
11	<p>Topic 11. Payment for natural resources and sources of their education Economic evaluation of natural resources. Natural and cost characteristics of natural resource potential. Costly, effective cost-resource, market and rental approaches to the economic evaluation of natural resources. Література: [1] с. 89-101.</p>	4
12	<p>Topic 12. In determining the amount of payment and collection of payments for pollution of the environment of Ukraine Legislative framework of environmental economics. Types of losses from environmental disturbances. The main methods of quantitative assessment of economic damage. Financial mechanisms of environmental activities. Standards and system of fees for environmental pollution. Get acquainted with the calculation of the amount of compensation for losses caused to the state as a result of violation of legislation on the protection and rational use of water resources Література: [1] с. 88-101.</p>	4
13	<p>Topic 13. Economic, environmental and social efficiency of environmental measures Socio-ecological-economic strategies of Ukraine towards harmonious development. bilateral agreements and treaties of Ukraine in the field of environmental protection. Mechanisms for implementing environmental and</p>	4

	<i>economic goals (three approaches). The main reasons for the "failures" of the market in the environmental sphere. Лимепамыпа: [1] c. 102-106.</i>	
Section 6. Basic principles of international experience in environmental safety management in the context of balanced development		
14	Topic 14. Improving the efficiency of public administration in Ukraine taking into account international experience <i>European experience of public administration in the field of environmental protection.. Лимепамыпа: [1] c. 23-32; [3] .</i>	4
15	Topic 15. Environmental education <i>Environmental education in the process of professional development of specialists of managerial level. Algorithm of environmental training of managerial personnel. Лимепамыпа: [2] c. 43-46.</i>	4
16	RGR	10
17	Preparing for ICR	4
18	Exam preparation	30
	Just	108

Policy and control

7. Policy of the discipline (educational component)

Rules for attending classes and behavior in classes

Attendance at classes is a compulsory component of assessment. 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

- *Encouraging points can be awarded by the teacher only for performing creative works on the discipline or additional passing of online specialized courses with obtaining the appropriate certificate:*
 - <https://www.coursera.org/learn/global-environmental-management>
 - <https://www.coursera.org/learn/circular-economy>
 - <https://www.coursera.org/learn/water-management>
 - <https://www.coursera.org/learn/environmental-management-ethics>
 - <https://www.coursera.org/learn/global-environmental-management>

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

- *Penalty points within the discipline are not provided.*

Deadlines and rebuilds policy

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

Academic Integrity Policy

Plagiarism and other forms of dishonest work are unacceptable. Plagiarism refers to the lack of references when using printed and electronic materials, quotes, opinions of other authors. Inadmissible hints and cheating when writing tests, conducting classes; passing an exam for another 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 section 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 section 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 assessing learning outcomes (RSO)

Distribution of study time by types of classes and tasks in the discipline according to the working curriculum:

Semester	Study time		Distribution of training hours				Control measures		
	Credits	Acad. year.	Lecture	Practical	Lab. rob.	SRS	MKR	PP	Semester control
7	4	120	36	18	–	66	1	1	Exam

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

A student's credit module rating consists of points that he receives for:

1. speeches with a report on the topic, which are submitted to practical classes or for independent work;
2. active participation in the work of practical classes;
3. performance of modular test work (divided into 2 tests of 45 minutes each);
4. performance of settlement work
5. answer to the exam.

System of rating (weight) points and evaluation criteria

1. Performing tasks in practical classes

Speech

Weight score – 5. The maximum number of points in all practical classes is 5 points \times 2 = 10 points.

Criteria for evaluating the report:

Report quality and protection	Bali
The topic of the report is fully disclosed; The student thoroughly explains all aspects of the relevant topic, draws the necessary conclusions and generalizations, and clearly answers the questions posed	5
The report provides a sufficient number of facts and examples; no proper analysis or comparison has been carried out; The answers to the questions have some inaccuracies	4
The report does not provide enough facts and examples; proper analysis has not been carried out; insufficiently clearly formulated conclusions; The answers to the questions are unclear or have some inaccuracies	3
The topic of the report is not sufficiently disclosed; no conclusions; There are no answers to individual questions.	2
The report does not correspond to the formulated topic; Most of the questions asked remained unanswered	1
Report not prepared	0

Participation in the discussion of issues submitted to the practical lesson

Weight score – 3, the maximum number of points in all practical classes is 3 practical classes \times 3 point = 9 points.

2. Execution of calculation tasks

The maximum number of points for completing the calculation task is 11 points.

Report quality and protection	Bali
The method and results of the calculations are correct	10... 11

<i>Some inaccuracies and technical errors in the calculations were made</i>	<i>8... 9</i>
<i>Inaccuracies and numerous errors in calculations</i>	<i>4 – 7</i>
<i>The calculation method is violated, only basic calculations are made, the result has significant inaccuracies</i>	<i>1 – 3</i>
<i>Task not completed</i>	<i>0</i>

3. *Modulartest paper:*

The test consists of 4 questions. Depending on the completeness and content of the answer to the theoretical questions, the student receives from 0 to 5 points. Thus, the maximum number of points for the test is 5 points × 4 = 20 points.

Criteria for evaluating test papers:

<i>Completeness and signs of response</i>	<i>Bali</i>
<i>Full answer to the question</i>	<i>5</i>
<i>A fairly complete answer with minor inaccuracies</i>	<i>4</i>
<i>The answer does not provide enough facts, examples and conclusions, or makes some inaccuracies</i>	<i>3</i>
<i>A partial answer is given, or serious mistakes have been made</i>	<i>2</i>
<i>The answer is superficial; There is no specific wording of laws and terms</i>	<i>1</i>
<i>"Unsatisfactory": Answer not counted or missing</i>	<i>0</i>

Thus, the maximum amount of points of the starting component from the credit module is:

$$R_c = 5 \cdot 2 + 9 + 11 + 5 \cdot 4 = 50 \text{ балів}$$

The examination component is 50% of R:

$$R_e = 50$$

The rating scale is:

$$R = R_c + R_e = 50 + 50 = 100 \text{ балів}$$

According to the results of educational work for the first 7 weeks, the "ideal student" should score 13 points. At the first certification (8th week), the student receives "credited" if his current rating is at least 7 points.

According to the results of educational work for 13 weeks of study, the "ideal student" should score 30 points. At the second certification (14th week), the student receives "credited" if his current rating is at least 20 points.

A prerequisite for admission to the exam is the enrollment of all practical classes, the implementation of the ICR at the level of the starting rating, which is at least 30 points.

At the exam, students answer 4 questions of the examination ticket. Questions are evaluated at 12.5 points.

Criteria for evaluating exam paper:

<i>Completeness and signs of response</i>	<i>Bali</i>
<i>Full answer to the question (more than 90% of the necessary information)</i>	<i>11– 12,5</i>
<i>A fairly complete answer with minor inaccuracies (more than 75% of the required information)</i>	<i>8– 10</i>
<i>The answer does not provide a sufficient number of facts, examples and conclusions, or made some inaccuracies (more than 60% of the necessary information)</i>	<i>5– 7</i>
<i>The answer is incomplete, facts and examples are not given, (less than 60% of the required information)</i>	<i>1– 4</i>
<i>The answer is not counted or missing</i>	<i>0</i>

The sum of the starting points obtained during the semester and all exam points is translated according to the table:

<i>Score</i>	<i>Score</i>
<i>95... 100</i>	<i>Perfectly</i>
<i>85... 94</i>	<i>very good</i>

75...84	well
65... 74	Satisfactory
60...64	enough
RD 60<	Disappointing
Not met the conditions of admission	Not allowed

9. Additional information on the discipline (educational component)

Sample list of questions submitted for semester control

1. Determine the place of environmental management in the system of other sciences. Give a modern conceptual approach to environmental management.
2. What are the principles of environmental management?
3. Identify the historical aspects of the development of environmental legislation in Ukraine. Analyze the international experience of environmental legislation.
4. Analyze and name the legislative acts that form the system of environmental legislation in the field of environmental protection.
5. Describe the basic regulatory principles set forth in the Declaration adopted at the United Nations World Conference on Environment and Development (Rio de Janeiro, 1992). Formulate general recommendations for implementing the principles of balanced development.
6. Describe the basic requirements for environmental management. Analyze what problems need to be overcome at this stage for the effective functioning of environmental management.
7. Give a classification of controls by system characteristics. Offer a basic model of the environmental management system.
8. Define the goal of state environmental management. Explain why management is targeted. Identify the main directions of state environmental management.
9. Determine the legislative framework for target areas of management. Compare general and special management, determine their main functions.
10. Describe the subjects exercising macro- and microecological management. Compare their authority in making management decisions.
11. List the existing levels of environmental management, reflecting the administrative-territorial structure of the state. Describe industry management. Explain the interaction of territorial and sectoral management on the example of a separate enterprise.
12. Describe the functions of general government bodies.
13. Identify special government bodies. Identify and compare the target functions they perform.
14. Identify the prerequisites and benefits of implementing a corporate environmental governance system. Analyze the basic principles of creating a corporate environmental management system.
15. Describe environmental impact assessment as one of the effective mechanisms of the state environmental management system.
16. Describe the world practice of environmental certification. Substantiate the current process of formation and implementation of environmental certification in Ukraine.
17. Give the principles of effective functioning of environmental certification. Justify the differences that exist between compulsory and voluntary certification. Identify the objects of mandatory environmental certification in the state system.
18. Justify the differences between environmental rationing and limiting. Describe the main indicators used to assess anthropogenic impact.
19. Describe the development of environmental standardization in Ukraine. Describe international, state, industry and local standards. The main disadvantages of environmental regulation at the present stage of its development.
20. Give the basic principles of the state policy of Ukraine in the field of licensing. Justify licensing as an effective environmental management toolkit.
21. Compare the strategic directions of environmental licensing: separate and comprehensive. What are the main stages of environmental licensing.
22. Describe the development, formation and legislative design of the Environmental Impact Assessment in Ukraine.

23. Describe the composition, content and procedure for developing Environmental Impact Assessment materials.
24. Describe the powers of state bodies in the field of environmental monitoring. List the types and functions of environmental monitoring.
25. Identify the main basis for the development of an environmental passport. Give the structure of the environmental passport of the enterprise.
26. Describe the main stages, goals and objectives of assessing the product life cycle. Offer a product life cycle diagram.
27. Compare the three types of eco labels. Define the role of international standards in the field of eco-labeling. Give a matrix of environmental cleanliness criteria.
28. Describe the structure of a typical environmental management system audit process.
29. Describe the audit plan requirements and structure. Compare responsibilities and voluntary audit.
30. Describe the process of environmental modernization of production. Compare the main types of wear: physical, functional, technological (moral), cost, environmental, managerial.
31. Identify how environmental marketing and engineering affect the improvement of the efficiency of investment activities of the corporation.
32. Conduct a comparative analysis of direct and indirect participants in the leasing agreement. Determine the benefits of the lessor and the lessee.
33. Describe environmental insurance as an important lever of economic stimulation of environmental measures.
34. Characterize the methods for determining the economic damage from environmental pollution.
35. Explain how the valuation of natural losses is carried out.
36. Describe the main functions of economic damage.
37. What are the main methods for determining economic damage.
38. Explain the definition of payments for emissions of pollutants into the atmosphere.
39. Describe the economic, environmental and social effects of environmental activities.
40. Public administration in the field of health care as a social phenomenon
41. Comparative analysis of health policy of the World Health Organization, the European Union and Ukraine.
42. The main directions of implementation of the state administration for health care in Ukraine.
43. Basic principles of public administration in the field of health.

Nfishing list of questions submitted for modular control work

1. Describe the mechanisms of environmental management.
2. Describe the principles on which environmental management is based.
3. Briefly describe the requirements for the effective functioning of environmental management.
4. Give the basic regulatory principles for harmonizing the coexistence of humanity and nature, set out in the Declaration adopted at the UN World Conference on Environment and Development (Rio de Janeiro, 1992).
5. Give a classification of controls by system characteristics, briefly describe them.
6. Draw a schematic model of an environmental management system.
7. Discover the biotic mechanism of environmental management.
8. Give a brief description of the ecological and economic balance of territories.
9. Describe the system of inventories of natural resources.
10. Explain the essence of the theoretical and methodological foundations of environmental management.
11. Explain the difference between "hard" and "soft" approaches in environmental management.
12. Describe the system-forming international principles of prevention, culprit and cooperation.
13. Explain the process of continuous improvement of the environmental management system.
14. Define the state environmental management system. Explain what is the main task of management.
15. List the target functions of state environmental management.
16. Describe the special functions of state environmental management.
17. Name the bodies of general government and determine the powers assigned to them.
18. Describe the system of indicators that determines the anthropogenic impact of pollutants on the environment.

19. Explain what principles and methodology underlie the environmental impact assessment.
20. Explain what mandatory and voluntary certification is.
21. Give the structure of the environmental passport of the enterprise.
22. Name the legislative acts that define the functions of local environmental management.
23. Describe the program of the environmental audit.
24. Explain the place of corporate environmental governance in the overall national environmental management system.
25. What are the goals and features of the assessment of environmental characteristics and product life cycle.
26. Describe the goals and features of environmental certification and labeling.
27. Explain the principles of greening the production system.
28. Explain how environmental marketing and engineering affect the improvement of the efficiency of investment activities of the corporation.
29. Name the legislative acts that define the functions of local environmental management.
30. What are the forms of public participation in environmental protection.
31. Explain how the economic damage from environmental pollution is determined.
32. Define actual, possible and preventable damages.
33. Describe the categories of payments for environmental pollution.
34. Provide a scheme for calculating payments for emissions of pollutants into the atmosphere by mobile sources of pollution.
35. Compare the schemes for calculating payments for emissions of pollutants into the atmosphere by stationary and mobile sources of pollution.
36. Explain how the amounts of payments for discharges of pollutants into surface waters, territorial and internal sea waters and underground horizons are determined.
37. Explain how the amount of payments for waste disposal in the environment is determined.
38. Explain the overall environmental effect of environmental measures.
39. Describe the socio-economic result of environmental measures.
40. Compare the actual and expected net economic effect. Explain how they are defined.
41. Define the concept of total economic efficiency. Explain the difference between the concepts of "effect" and "effectiveness".
42. Explain what characterizes the indicator of comparative economic efficiency of environmental costs.
43. Describe the system of incentive measures in the environmental protection system.

SET OF TASKS FOR THE WGR

The purpose of the design and graphic work is to consolidate and deepen the knowledge gained during lectures and practical classes related to the study of aspects of managing the implementation of environmental projects in order to increase the efficiency of environmental activities.

Settlement and graphic work is carried out on the basis of an individual task for the student.

The WGR is drawn up in the form of a settlement and explanatory note of 12-17 pages, which contains: calculation tasks; content; Entry; calculation part; Conclusions; list of literary references; applications (if necessary).

Task. Calculate the economic efficiency of an environmental project of reprofiling (modernization) of one of the workshops of the enterprise (industrial or municipal) for the production of building materials, fuel composition with the extraction of metals, using some industrial and municipal solid waste. The cost of waste (raw materials for processing) equals 40 UAH/t. Variations of output data for calculation and graphic work for calculating the economic efficiency of the project and its indicators are given in the table.

Variant	Quantity of waste, t/day	Cost of equipment, thousand UAH		
		likvidovanogo	Used	Installed
1	49	150.8	454.5	910.1
2	53	189.8	577.3	867.2
3	35	190.5	473.4	814.5
4	53	183.4	603.1	975.3
5	51	163.8	501.5	819.6
6	30	195.9	505.7	991.9
7	36	136.3	532.6	852

8	41	119.7	585.2	847.1
9	37	188.6	437.1	887.7
10	34	124.1	411.7	902.8
11	46	115.6	537.6	904.2
12	36	103.8	469.3	839.9
13	46	140.7	501.8	949
14	43	165.6	402.9	982.8
15	34	145.1	477.1	894.5
16	44	147.2	474.9	930.5
17	33	195.1	548.4	822.9
18	36	163.2	570.1	868.6
19	48	166.6	579.6	970.4
20	40	118.4	416.8	931.7
21	48	109.4	533.5	914.8
22	43	105.3	593.9	908.3
23	54	162.3	441.8	958.3
24	42	137.5	554.2	883.8
25	45	142.2	502.5	945.6
26	43	167.2	454.9	930.7
27	39	185.1	538.4	842.9
28	37	163.2	550.1	868.6
29	43	136.6	559.8	960.7
30	49	118.4	426.8	941.7
31	47	129.4	543.3	917.4
32	42	108.3	573.9	938.3
33	55	172.3	545.8	968.5
34	46	167.5	564.1	983.9
35	45	128.2	522.5	955.5

Work program of the discipline (syllabus):

Compiled by Assoc., Ph.D., Trus I.M.

Approved by the Department of E and PPT (protocol № 17 from 23.05.2024)

Approved by the methodological commission of the

Faculty of Engineering and Chemistry (protocol № 11 from 28.06.2024)