to the Order of March 23, 2023 № 244

NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE
Faculty of Plant Protection, Biotechnology and Ecology

"CONFIRMED"
Dean of the Faculty
of Plant Protection, Biotechnology and Ecology
Kolomiets Y.V.
"01" 06 2023 p.

"APPROVED"
at the meeting of the department of
Agrosphere Ecology and Environmental Control
Protocol №5 dated "03" 05 2023 p.
Head of Department
Naumovska O.I.

"REVIEWED"
Program Coordinator OP 101 Ecology
Bogolubov V.M.

PROGRAM OF THE COURSE

Standardization of anthropogenic load on the environment

Specialization 101 "Ecology"
Educational program "Ecology"
Faculty Plant Protection, Biotechnology and Ecology

Developers: Ass. Professor. Candidate of Biology Sciences **Rubezhniak Iryna**

Kyiv – 2023 p.

1. Description of the course "Standardization of anthropogenic load on the environment"

Field of knowledge, specialization, educational program, educational degree		
Educational degree	Bachelor's	
Specialization	101-Ecology	
Educational degree	Ecology	
Characteristics of the course		
Type	Compulsory/elective	
Total number of hours	120	
Number of ECTS credits	4	
Number of content modules	2	
Course project (work) (if applicable)		
Form of assessment	Exam	
Indicators of the course for full-time and part-time forms of study		
	Full-time form of study	Part-time form of study
Course (year of study)	2	
Semester	4	
Lecture classes	30 hr.	
Practical, seminar classes	30 hr.	
Laboratory classes		
Self-study	60 hr.	
Individual assignments		
Number of weekly classroom hours for the full-time form of study	4 hr.	

2. PREAMBLE

Goal of the course to obtain a knowledge of the theoretical knowledge and analytical skills about anthropogenic load normalization, rules and regulation, to apply the require ecological normative documents.

Learning objectives are water, soil, air, food contamination normative documents

Learning outcome of course:

- subject, targets and methods required for appropriate ecological research;
- principles of environment normalization and indexes of the anthropogenic load on the environment;
- toxicity observation, pollutions classification, main ecosystem's pollutants;
- research of the anthropogenic impact levels and scopes;
- main standards or indexes (MAC, MAL, MPE, MPD) using and elaboration of design documents.

Upon completion of this course, students should be known

- classification of the ecological standards;
- the quality standards of the drinking water and standards of the maximal allowable discharges of the chemicals into the water body**;**
- classification and standardizations of the soil contamination;
- classification and standardizations of the air pollution: standards of the air pollution of the cities, the occupational air and the working territory;
- the state sanitary norms and rules of protection of the population from influence of electromagnetic fields which are sent out by the radio engineering objects;
- electric fields of industrial frequency, permissible levels of voltage;
- the noise contaminations and their standards;
- standardization of ultrasound and infrasound;
- foodstuff contaminations and their standards;
- effect of the different pollutants on the environment, ecosystems, humans, flora and fauna.

- **should be able:**
  - estimate of the water quality using the standards of the environmental safety of the water consumption;
  - calculate soil contamination level, air pollution and food contamination;
  - calculate maximum allowable emission and maximum permissible discharge of pollutants;
  - apply the normative permissible level of electric fields, electromagnetic fields, noise, ultrasound and infrasound in practice;
  - estimate voltage of electric fields and apply the requirements to the monitoring procedure on the workplaces.

Competencies:

general competencies (GC):

K01. Knowledge and understanding of the subject area and professional activity

K07. The ability to act socially responsibly and consciously.

K08. Ability to conduct research at the appropriate level.

professional (special) competencies (FC):

K18. Ability to assess the impact of technogenesis on the environment and identify environmental risks associated with production activities.

K26. Ability to participate in the management of environmental actions and / or environmental projects.

Professional (special) competencies (PC): PRN01. Understand the main concepts, theoretical and practical problems, the history of development and the current state of scientific knowledge in ecology, environmental protection and nature management; formulate and test hypotheses, use appropriate evidence

(results of theoretical analysis, experimental studies, and mathematical and computer modeling) to substantiate conclusions in order to solve significant scientific and scientific-applied problems of ecology.

PRN06. Have up-to-date conceptual knowledge and a high methodological level in the field of ecology and at the border of subject areas, as well as research skills sufficient to conduct scientific and applied research at the level of the latest world achievements.

PRN06. Have modern conceptual knowledge and a high methodological level in the field of ecology and on the border of subject areas, as well as research skills sufficient to conduct scientific and applied research at the level of the latest world achievements.

3. Program discipline

Module and themes	Hours					
	Stationary form					
	Total number	Including				
		Lect.	Pract.	Lab.	Indiv.	Self-train
1	2	3	4	5	6	7
Module 1.						
Module 1. Standardization of water, air pollution and soil contamination						
Lecture 1. Standardization of anthropogenic load on the environment. Introduction	10	2	2			4
Lecture 2. Standardization of quality of air	10	2	2			4
Lecture 3. Standardization of impact on air quality	10	2	2			4
Lecture 4. Norms of anthropogenic load on the water objects	10	2	2			4
Lecture 5. Evaluation methods of water quality	10	2	2			4
Lecture 6. Microflora and indicative bacteria of water. The methods of studying	10	2	2			4
Lecture7. Standardization of soil contamination	10	2	2			4
Lecture 8. Microflora and sanitary-indicative bacteria of the soil. The methods of studying	10	2	2			4
Total hours of module 1	**80**	**16**	**16**			**32**
Module 2. Physical pollution. Food pollution						
Lecture 9. Noise pollution	10	2	2			4
Lecture 10. Ultrasound pollution of the environment	10	2	2			4
Lecture 11. Infrasound and its impact on the environment	10	2	2			4
Lecture 12. Electromagnetic pollution of the environment	10	2	2			4
Lecture 13. Electric pollution	10	2	2			4
Lecture 14. Food contamination. Part I	10	2	2			4
Lecture 15. Food contamination. Part II	10	2	2			4

Total number module II	**70**	**14**	**14**			**28**
Total number	**120**	**30**	**30**			**60**

4. SELF-TRAINING THEMES

№	Name of theme	Hours
1	Ecological standards	10
2	Standard (limits) of use of natural resources	10
3	Standard of sanitary and protective zones	10
4	Classification of maximum allowable concentration of city air	10
5	The ecological standard of water quality	10
6	Standard role on quality of drinking water	10
7	Standards of maximum allowable discharges of substances into water body	10
8	Standards of electric and electromagnetic fields	10
9	Regulation of noise, infrasound and ultrasound pollution	10
Total		**90**

5. APPROXIMATE THEMES OF PRACTICS

№	Name of theme	Hours
1	Main list of normative documents in Ukraine and its implementation. Primary toxicity norms and indexes. Pollutants danger classifications	4
2	Calculation algorithm of Maximal Permissible Discharge (MPD)	4
3	Combined Effect Rate (CER) definition and Maximal Permissible Pollutions (MPP) calculating in atmosphere using CER	4
4	Scenariot products pollutants norms. Maximum Permissible Level (MPL) Calculation of Maximum Permissible Emission (MPE)	4
5	Heavy metals normalization in agro-ecosystems	4
6	Pollution Density Index (PDI) calculation. Radionuclide Permissible Level (RPL).	4
7	Soil pollutants normalization. Summery toxicity Index. Pesticides Maximum Permissible Concentration (MPC) definition in soil.	4
8	Fertilizers state testing conducting. Requires of fertilizers assessment and fertilizers using norms.	4
Total		**30**

6. Control questions

1. Standardization of soil contamination of urban territory
2. Main established ecological standards of natural resources use
3. Main established standards of quality of the environment
4. Standardization of land pollution of plant territory
5. Main established standards of impact on the environment
6. Standardization of water bodies of potable consumption
7. Standardization of water bodies for domestic consumption
8. Standardization of water bodies of fish breeding consumption
9. Standardization of soil contamination of agricultural area

10. Sanitary indicators of biological pollution of soil of urban area
11. Sanitary indicators of biological pollution of water quality
12. Standardization of infrasound pollution: sources, regulation, human impact
13. Standardization of electromagnetic pollution: sources, regulation, human impact
14. Standardization of electric pollution: sources, regulation, human impact
15. Standardization of food pollution: balance of nutrients, structure of foodstuff, environmental contaminants
16. Standardization of noise pollution of urban territory: sources, regulation, human impact
17. Standardization of ultrasound pollution: sources, regulation, human impact
18. Standardization of technical noise pollution**:** sources, regulation, human impact
19. Types of food contamination, examples
20. Alimentary poisonings not microbe ethology by chemical materials
21. Food poisonings of microbial aetiology
22. Mycotoxicosis: sources, regulation, human impact
23. Standardization of food pollution and regulation

7. Training method*:* *theoretical and practical lessons, self-study*

8. Form of control: *exam*

9. Розподіл балів, які отримують студенти

Assessment of student knowledge is on a 100-point scale and is translated into national assessments according to table. 1 "Regulations on examinations and tests in NULES of Ukraine" (order of entry into force 27.12.2019 № 1371).

Рейтинг студента, бали	**Оцінка національна за результати складання**	
	екзаменів	**заліків**
90-100	**Відмінно**	**Зараховано**
74-89	**Добре**	
60-73	**Задовільно**	
0-59	**Незадовільно**	**Не зараховано**

Student rating, points	**National grade for the results of the exam**	
	exam	**tests**
90-100	**Excellent Credited**	**Credited**
74-89	**Good**	

60-73	**Satisfactory**	
0-59	**Unsatisfactory**	**Not credited**

To determine the rating of the student (listener) for mastering the discipline **Rdis** (up to 100 points) the obtained rating for certification (up to 30 points) is added to the rating of the student (listener) for academic work **Raw** (up to 70 points):

R dis = R dis + R aw

Для визначення рейтингу студента (слухача) із засвоєння дисципліни **Rдис** (до 100 балів) одержаний рейтинг з атестації (до 30 балів) додається до рейтингу студента (слухача) з навчальної роботи **Rнр** (до 70 балів): **R дис** = **R нр** + **R ат**

10. METHODOLOGICAL SUPPORT

1. Rubezhnyak I.G. Workbook to self-study training under supervision of discipline “Standardization of environmental protection” for students of higher education institute of III - IV accreditations levels for direction 0401 “Ecology, environmental protection and environmental management”. - Kiev. -2010.- 72p

2. Методичні вказівки з дисципліни: «Нормування антропогенного навантаження на природне середовище» з практичних робіт для студентів вищих навчальних закладів освіти III-IV рівнів акредитації з напрямку підготовки 6.040106 “Екологія, охорона навколишнього середовища та збалансоване природокористування». – Київ, 2012. – 45с.

11. MAIN AND ADDITIONAL RESOURCES OF INFORMATION FOR THE

1. “Popular commentary on the Law of Ukraine "On Environmental Impact Assessment" / E. Alekseeva [edited by O. Kravchenko] - Publishing House "Company "Manuscript" - Lviv, 2018. - 60 p.

2. Strategic environmental assessment: opportunities for the public (manual) / C. Shutyak [edited by O. Kravchenko] - Publishing House "Company "Manuscript" - Lviv, 2017. - 28 p.

3. Law of Ukraine On Environmental Expertise https://zakon.rada.gov.ua/laws/show/45/95- %D0%B2%D1%80#Text.

4. Problematic issues of the EIA procedure: analysis and proposals / O. Tarasova, O. Bondarenko, V. Sharavara, G. Protsiv, R. Gavrylyuk, D. Gulevets, I. Timchenko, S. Savchenko, O. Gusev, K. Zhurbas – Kyiv: NECU, 2018. – 16 p.

5. Alekseeva E. Environmental Impact Assessment: International standards, experience of other countries and prerequisites for the introduction of a new model of environmental impact assessment in Ukraine and its main elements / S. Vykhrist, E. Yendroshka, N. Mikulich, D. Skrylnikov, M. Shymkus. – Kyiv 2018. – 141 p.

6. Resolution of the Cabinet of Ministers of Ukraine No. 1029 of 13.12.2017 "On approval of the Procedure for the transfer of documentation for providing an opinion on environmental impact assessment and financing of environmental impact assessment and the Procedure for maintaining the Unified Register for Environmental Impact Assessment".

7. Resolution of the Cabinet of Ministers of Ukraine No. 989 of 13.12.2017 "On Approval of the Procedure for Holding Public Hearings in the Process of Environmental Impact Assessment".

8. LIST of information specified by the business entity for registration in the Unified Register for Environmental Impact Assessment https://zakon.rada.gov.ua/laws/show/1026-2017- %D0%BF#n79.

9. Law of Ukraine "On Environmental Impact Assessment", No. 2059-19 of May 23, 2017. https://zakon.rada.gov.ua/laws/show/2059-19#Text.