Appx 2

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

Urban ecology

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 “Urban ecology”

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	162	
Number of ECTS credits	5	
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)	4 hr.	5 hr.
Semester	7 hr.	9 hr.
Lecture classes	30 hr.	12 hr.
Practical, seminar classes	15 hr.	10 hr.
Laboratory classes		
Self-study	117 hr.	128 hr.
Individual assignments		
Number of weekly classroom hours for the full-time form of study	3 hr.	2 hr.

2. Goal of the course will be to understand how interactions between humans and the environment drive and are driven by the built environment especially in the context of the physical and biological.

Learning objectives are physical and biological factors that drive the ecology of urban areas.

Learning outcome of course is the student's ability as a specialist:

- Gain a wider understanding of urban ecological and environmental issues ranging from biodiversity to climate resilience and appreciate potential approaches for cities to deal with ecological and environmental challenges and threats of climate change.
- Enhance abilities and skills relating to evaluation of environmental and social impacts of urban development.

Upon completion of this course, students should be known

- The interaction between humans and the urban environment, especially the interplay between humans, biological systems, and the abiotic environment.
- The concept of the urban ecosystem
- Principles of landscape ecology in an urban context, especially fragmentation and island biogeography
- Evolutionary adaptation of humans and other organisms in an urban environment
- Climate change and urbanization

should be able:

- to analyze urban ecological systems in terms of proximate and ultimate causation;
- to work with multi-level systems interactions;
- to use basic conceptual and analytical tools for describing and quantifying ecological problems of city;
- to understand and use fundamental analytical methods to describe dynamics of anthropogenic changes of the urban environment;
- discuss key theories of urban ecological systems;
- to recognize and evaluate different ecosystem patterns and their social implications;
- make policy recommendation for a more sustainable urban future;
- understand major arguments in and the critical concerns of urban political ecology;
- describe and appreciate the complex and diverse relationships between cities and ecology, and between human and the built environment;
- to integrate their knowledge about ecological problems.

Acquisition of 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 an appropriate level

Professional (special) competencies (PC):_____

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

K19. Ability to use the basic principles and components of environmental management.

K22. Ability to participate in the development of the management and waste management system

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

3. Program discipline

Module and themes	Hours					
	Stationary form					
	Week	Total number	Including			
			Lect.	Lab.	Indiv.	Self-train
Module 1. Urban geosocial systems and their abiotic part						
Lecture 1. Urbanization. The urban environment	1	8	2	2		7
Lecture 2. Geographic environment of the city	2	8	2			8
Lecture 3. Soil structure	3	8	2	2		8
Lecture 4. Types of land and relief pollution	4	8	2			8
Lecture 5. The water environment of city	5	8	2	2		8
Lecture 6. Ground water of urban territory. Pollution	6	8	2			8
Lecture 7. Drinking water consumption of city	7	8	2	2		8
Lecture 8. Types of water pollution and sources of pollution of urban territory	8	8	2			8
Total number of module 1		**64**	**16**	**8**		**63**
Module 2. Urban air. Urban flora and fauna						
Lecture 9. The air environment of city	9	7	2	1		8
Lecture 10. The air pollution of city	10	8	2			8
Lecture 11. Urban microclimate	11	11	2	2		7
Lecture 12. Plant improvement of city	12	11	2	2		7
Lecture 13. Classification of urban plantations of Ukraine	13	9	2			8
Lecture 14. Role flora and fauna in urban ecosystem and lives of urban population	14	8	2	1		8
Lecture 15. Anthropogenic and urban landscapes	15	8	2	1		8
Total number of module 2		**56**	**14**	**5**		**54**
Total number		**162**	**30**	**15**		**117**

4. LABWORKS THEMES

№ з/п	Name of theme	Hours
1	Coal and environment	2
2	Volume of municipal water supply	2
3	Determination of the relationship between food, fuel and solar energy for certain regions	2

4	The nitrogen containing compounds in wastewater	2
5	Determination of the effects of different doses of toxic hazardous metals on physiological parameters of plants	2
6	Determination of water content in soil samples	2
7	Sanitary and hygienic evaluation of green plants in populated territories	3
Разом		**15**

5. SELF-TRAINING THEMES

№	Name of theme	Hours
1.	Chemical pollution of urban soils	27
2.	Surface flow from urban territory	30
3.	The assessment of air pollution by industrial enterprises	30
4.	Polygon of solid domestic wastes and their impact on the environment	30
Total		117

6. CONTROL QUESTIONS

1. Essence of urbanization
2. Classification of soil contamination
3. Decentralized water supply of city
4. Definition of sewage and its types
5. Classification of pollution sources of water objects based on the origin sources
6. Municipal sewage works and its structure
7. Indicators of chemical pollution of soil
8. Types of physical pollution of the urban geographic environment
9. Centralized water supply of city
10. Classification of sources of water pollution
11. Urban ecology: basic task, object and subject
12. Anthropogenic changes of relief
13. The urban geosocial system, components
14. Surface runoff from residential and industrial territory
15. Main classification of water pollution sources
16. Climate changes of the city
17. Function of plant melioration systems
18. Functions of plants in the cities
19. Separation and dimensional measurement of green zones of Ukrainian cities
20. Classification of pollution sources of water objects based on localization
21. Properties of the plants used in structure of city and suburban plantations
22. Properties of urban biotope
23. Microbiotopes of human dwellings
24. Classification of species areas

25. Characteristic of atmosphere pollutants
26. Classification of air pollution sources
27. Types and conditions of smog formation
28. Ways formation of urban biotopes
29. Phytoimprovement systems and their classification
30. Changes of urban area of flora and fauna species

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

8. Form of control

exam

9. Розподіл балів, які отримують студенти

Оцінювання знань студента відбувається за 100-бальною шкалою і переводиться в національні оцінки згідно з табл. 1 «Положення про екзамени та заліки у НУБіП України» (наказ про уведення в дію від 27.12.2019 р. № 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**

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. Методичні вказівки до виконання самостійної робота під керівництвом НПП з дисципліни «Екологія міських систем» для студентів денної форм навчання зі спеціальності 6. 070801— Екологія та охорона навколишнього середовища. – Київ, 2012. – 47с.(англійська мова)

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, 2021. – 45с.

11. MAIN AND ADDITIONAL RESOURCES OF INFORMATION FOR THE ‘URBAN ECOLOGY’ SUBJECT

1. Рубежняк І.Г. Конспект лекцій з дисципліни «Екологія міських систем» для студентів спеціальності 101 «Екологія». – Київ, 2018. – 208с.

2. Рубежняк І.Г. Методичні рекомендації для проведення лабораторних робіт з дисципліни «Екологія міських систем» студентами ОКР «Бакалавр» спеціальності 101 «Екологія».- Київ, 2018. -47с.

3. Рубежняк І.Г. Методичні рекомендації для проведення самостійної роботи з дисципліни «Екологія міських систем» студентами ОКР «Бакалавр» спеціальності 101 «Екологія».- Київ, 2017. - 55с.

4. Urban Ecology. An Introduction/ By Philip James, Ian Douglas – Copyright, 2015. -500 p.

5. Urban Ecology. Emerging Patterns and Social-Ecological Systems/ A. S. Raghubanshi, Pardeep Singh, Pramit Verma, Rishikesh Singh- Elsevier Science, 2020.-532 p.

12. INTERNET RESOURCES

1. Урбанізація та урбоекосистеми - [Доступ до інтернет ресурсу]: https://pidru4niki.com/71478/ekologiya/urbanizatsiya_urboekosistemi

2. ЕКМС: Лекція 1 Тема. Вступ. Урбоекологія як наука - [Доступ до інтернет ресурсу]: https://cdn.snau.edu.ua/moodle/mod/page/view.php?id=96901