Syllabus
educational component
(conditional designation OK in the educational program (OP))

Ecology

Subjects:	**Ecology**
Level of higher education:	**The initial (short cycle)**
Course page in Moodle:	*https://dl.khadi.kharkov.ua/course/view.php?id=1735*
The scope of the educational component	**3 credits (90 hours)**
Final control form	**Test**
Consultations:	**on schedule**
Name of the department:	**Department of Ecology**
Teaching language:	**English**
Course leader:	**Zipunnikov Mykola**
Contact phone number:	*707-37-41*
E-mail:	**zipunnikov_n@ukr.net**

Brief content of the educational component:
The goal is the formation of future specialists' knowledge, skills and practical skills aimed at mastering the general principles and aspects of the ecosystem approach to minimizing anthropogenic impacts on the environment, including man-made ones related to the development of the road network and assessing the consequences of these impacts.
Subject: theoretical and methodological foundations, methodological provisions of scientific areas of ecology at the current stage.
The main tasks of studying an academic discipline are:
– substantiation and presentation of the unified theoretical and methodological foundations of the environmental protection system;
– formation of directions for improvement of the environmental protection system during the construction of highways;
– formation of skills in the organization of independent research work and presentation of the results of scientific research.

Prerequisites for studying the educational component:
Chemistry.

Competencies acquired by the acquirer:
General competences:
Ability to search, process and analyze information from various sources.
The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technologies, to use various types and forms of motor activity for active recreation and leading a healthy lifestyle.

Special (professional) competences:
The ability to design construction structures, buildings, bridge and tunnel structures taking into account engineering and technical, geological and hydrological features and resource-saving measures, legal, social, ecological, technical and economic indicators,

scientific and ethical aspects, and modern requirements of regulatory documentation in the field architecture and construction, environmental protection and labor safety.

Ability to take responsibility for developing and making decisions in the field of architecture and construction in unpredictable work contexts.

Awareness of the principles of designing agricultural territories.

The ability to organize work in accordance with the requirements of life safety and occupational health and safety.

Ability to perform technical control, supervision during construction, repair and reconstruction of bridges and tunnels.

Learning outcomes according to the educational program:

Apply basic theories, methods, and principles of mathematical, natural, social, humanitarian, and economic sciences, modern models, methods, and decision support software to solve complex construction and civil engineering problems.

Design construction structures, buildings, structures, engineering networks and technological processes of construction production, taking into account engineering and technical, geological, hydrological factors and resource-saving measures, legal, social, ecological, technical and economic indicators, scientific and ethical aspects, and modern requirements of regulatory documentation, time and other restrictions, in the field of architecture and construction, environmental protection and occupational safety.

Assess the compliance of projects with the principles of designing urban territories and infrastructure facilities and urban economy.

Have in-depth cognitive and practical skills/skills, mastery and innovation at the level necessary for solving complex specialized tasks in the field of construction and civil engineering, in particular, in bridge and tunnel construction
directions

Have knowledge of modern design and construction technologies. The ability to rationally organize the technological processes of construction, reconstruction, and equipment of buildings and structures in connection with assembly diagrams, with appropriate construction mechanisms and machines, with the features of the surrounding space. Organize and manage construction processes during the construction, operation and reconstruction of highways, bridge and tunnel structures.

Know the regulatory and legal principles of relations in the field of design, construction and operation of highways and bridge structures on them to ensure the needs of the state and citizens with the results of their activities. To organize the implementation of labor protection requirements during the construction, repair and operation of bridge and tunnel structures, based on modern provisions of legislative and regulatory acts. To have the basic methods of identifying technological risks, threats and dangers at workplaces and to apply them in the development of measures to increase labor safety, to protect working personnel from the possible consequences of accidents at work.

Thematic plan

№ of topic	Name of topics (LC, LW, PW, SC, IW)	Number of hours	
		Intramural	Extramural
1	LC Modern ecology, its subject, methods and tasks.	2	
	LW Safety technology during laboratory work.	4	
	IW Interrelationship of ecology with other sciences.	4	
2	LC Theoretical aspects of ecology.	2	
	IW The main patterns of interaction between living organisms and the environment. IW Human influence on the structure and functioning of ecological systems.	4 4	
3	LC Indicators of surface water quality.	4	
	LW Determination of the enterprise hazard category indicator.	4	
	IW Ecological consequences of atmospheric pollution. Basic methods of atmospheric air purification. IW Environmental consequences of hydrosphere pollution. Main measures to reduce pollution of the hydrosphere.	6 8	
4	LC Standardization of environmental pollution.	2	
	LW Assessment of the level of atmospheric air pollution by vehicle exhaust gases in a separate area.	4	
	IW Regulation of air quality. IW Regulation of water quality. IW Standardization of soil quality.	4 6 6	
5	LC Prospects of hydrogen energy and environmental problems.	4	
	LW Quantitative determination of the components of anti-icing mixtures in the soil.	4	
	IW Assessment of environmental safety of waste use. industries in the production of bridges and transport tunnels. IW Reduction of dust pollution in the production of road construction materials.	6 6	
6	LC Environmental aspects of design, construction and operational maintenance of bridges and transport tunnels.	2	
	IW Reduction of parametric pollution during operation of bridges and transport tunnels. IW Reduction of ingredient contamination during operation. bridges and transport tunnels.	8 4	
Разом	LC	16	
	LW	16	
	IW	66	

Individual educational and research task (if available):

Teaching methods:
1) verbal: 1.1 traditional: lectures, explanations, stories, etc.;
1.2 interactive (non-traditional): problem lectures, discussions, etc.;
2) visual: method of illustrations, method of demonstrations;
3) practical: 3.1 traditional: laboratory classes.

Evaluation system and requirements:

Current performance

1 The current performance of applicants for the performance of educational types of work in training sessions and for the performance of independent work tasks is evaluated using a four-point rating scale with subsequent transfer to a 100-point scale. During the evaluation of current performance, all types of work provided for by the educational program are taken into account.

1.1 Lecture classes are evaluated by determining the quality of performance of specified tasks.

1.2 Practical classes are evaluated by the quality of performance of a control or individual task, performance and design of practical work.

2 Evaluation of the current academic performance of students of higher education is carried out at each practical session on a four-point scale ("5", "4", "3", "2") and is entered in the journal of academic performance.

– "excellent": the winner mastered the theoretical material flawlessly, demonstrates in-depth knowledge of the relevant topic or academic discipline, the main provisions;

– "good": the applicant has mastered the theoretical material well, has the main aspects from primary sources and recommended literature, presents it in a reasoned manner; has practical skills, expresses his thoughts on certain problems, but certain inaccuracies and errors are assumed in the logic of the presentation of theoretical content or in the analysis of practical ones;

– "satisfactory": the applicant has basically mastered the theoretical knowledge of the educational topic or discipline, orients himself in primary sources and recommended literature, but answers unconvincingly, confuses concepts, answers additional questions uncertainly, does not have stable knowledge; when answering questions of a practical nature, reveals inaccuracy in knowledge, does not know how to evaluate facts and phenomena, connect them with the future profession;

– "unsatisfactory": the applicant has not mastered the educational material of the topic (discipline), does not know scientific facts, definitions, hardly orients himself in primary sources and recommended literature, lacks scientific thinking, practical skills are not formed.

3 The final score for the current activity is recognized as the arithmetic mean sum of points for each lesson, for individual work, current test works according to the formula:

$$K^{current} = \frac{K1 + K2 + \cdots + Kn}{n},$$

де $K^{current}$ – final assessment of success based on the results of current control;

$K1, K2, \ldots, Kn$ – evaluation of the success of the current control measure;

n - the number of measures of current control.

Estimates are converted into points according to the calculation scale (table 1).

Table 1 – Recalculation of the average grade for the current activity into a multi-point scale

4- points scale	100- points scale	4- points scale	100- points scale	4- points scale	100- points scale	4- points scale	100- points scale
5	100	4,45	89	3,90	78	3,35	67
4,95	99	4,4	88	3,85	77	3,3	66
4,9	98	4,35	87	3,80	76	3,25	65
4,85	97	4,3	86	3,75	75	3,2	64
4,8	96	4,25	85	3,7	74	3,15	63
4,75	95	4,20	84	3,65	73	3,1	62
4,7	94	4,15	83	3,60	72	3,05	61
4,65	93	4,10	82	3,55	71	3	60
4,6	92	4,05	81	3,5	70	from 1,78 to 2,99	from 35 to 59
						reassembly	
4,55	91	4,00	80	3,45	69	from 0 to 1,77	from 0 to 34
4,5	90	3,95	79	3,4	68	repeated study	

Final assessment

1 A student of higher education receives a credit in the last lesson in the discipline based on the results of the current assessment. The average score for the current activity is converted into points on a 100-point scale, according to the conversion table (table 1). Applicants for higher education who have a current grade point average in the discipline lower than "3" (60 points) can increase their current grade by taking tests in the discipline in the last session.

Assessment of the knowledge of applicants through testing is carried out according to the following scale:

- "Excellent": at least 90% of correct answers;
- Very good": from 82% to 89% of correct answers;
- "Good": from 74% to 81% of correct answers;
- "Satisfactory": from 67% to 73% of correct answers;
- "Satisfactory enough": from 60% to 66% of correct answers;
- "Unsatisfactory": less than 60% of correct answers.

2 The condition for obtaining credit is: - making up for all missed classes; – the average current grade in the discipline is not lower than "3" (60 points).

3 For performing individual independent work and participation in scientific events, additional points are awarded to the winners.

3.1 Additional points are added to the sum of points scored by the student of higher education for the current educational activity (for disciplines for which the final form of control is a credit), or to the final grade in the discipline for which the final form of control is an exam.

3.2 The number of additional points awarded for different types of individual tasks depends on their volume and significance:

- prize places in the discipline at the international / all-Ukrainian competition of scientific student works - 20 points;
- prize places in the discipline at the All-Ukrainian Olympiads - 20 points;

– participation in the international / all-Ukrainian competition of scientific student works - 15 points

– participation in international / all-Ukrainian scientific conferences of students and young scientists - 12 points;

– participation in all-Ukrainian Olympiads in the discipline - 10 points

– participation in Olympiads and scientific conferences of the Khnadu in the discipline - 5 points;

– performance of individual scientific and research (educational and research) tasks of increased complexity - 5 points.

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3.3 The number of additional points cannot exceed 20 points.

4 The learning result is evaluated (select is required): – on a two-point scale (passed/failed) according to table 2; – on a 100-point scale (for differentiated assessment) according to table 3. The final grade together with additional points cannot exceed 100 points.

Table 2 – Scale for transferring points to the national evaluation system

On a 100-point scale	On a national scale
From 60 points to 100 points	Counted
Less than 60 points	Not counted

Table 3 – The scale for evaluating the knowledge of students based on the results of the final control of the academic discipline

Score in points	Evaluation on a national scale		Evaluation according to the scale of the European credit transfer-accumulation system	
	examination	test	estimation	Criteria
90-100	**Perfectly**	**Enrolled**	**A**	The theoretical content of the course has been mastered in its entirety, without gaps, the necessary practical skills for working with the mastered material have been formed, all educational tasks provided for in the training program have been completed, the quality of their performance has been assessed with a number of points close to the maximum.
80–89	**Fine**	**Enrolled**	**B**	The theoretical content of the course has been mastered in its entirety, without gaps, the necessary practical skills for working with the mastered material have mainly been formed, all educational tasks provided for by the training program have been completed, the quality of most of them has been assessed with a number of points close to the maximum.

<table>
<tr><td rowspan="2">Score in points</td><td colspan="2">Evaluation on a national scale</td><td colspan="2">Evaluation according to the scale of the European credit transfer-accumulation system</td></tr>
<tr><td>examination</td><td>test</td><td>estimation</td><td>Criteria</td></tr>
<tr><td>75-79</td><td></td><td rowspan="3"></td><td>C</td><td>The theoretical content of the course has been mastered in its entirety, without gaps, some practical skills of working with the mastered material have not been formed enough, all educational tasks provided for by the training program have been completed, the quality of none of them has been assessed with a minimum number of points, some types of tasks have been completed with errors.</td></tr>
<tr><td>67-74</td><td rowspan="2">Satisfactorily</td><td>D</td><td>The theoretical content of the course is partially mastered, but the gaps are not of a significant nature, the necessary practical skills for working with the mastered material are basically formed, most of the educational tasks provided by the training program have been completed, some of the completed tasks may contain errors.</td></tr>
<tr><td>60–66</td><td>E</td><td>The theoretical content of the course has been partially mastered, some practical work skills have not been formed, many educational tasks provided by the training program have not been completed, or the quality of some of them has been assessed with a number of points close to the minimum.</td></tr>
<tr><td>35–59</td><td>Unsatisfactorily</td><td rowspan="2">Not counted</td><td>FX</td><td>The theoretical content of the course has been partially mastered, the necessary practical work skills have not been formed, most of the prescribed training programs of educational tasks have not been completed, or the quality of their implementation has been assessed with a number of points close to the minimum; with additional independent work on the course material, it is possible to improve the quality of the performance of educational tasks (with the possibility of retaking).</td></tr>
<tr><td>0–34</td><td>Unacceptable</td><td>F</td><td>The theoretical content of the course has not been mastered, the necessary practical work skills have not been formed, all completed educational tasks contain gross errors, additional independent work on the course material will not lead to any significant improvement in the quality of the performance of educational tasks (with a mandatory repeat course).</td></tr>
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Course policy:

– the course involves working in a team, the environment in the classroom is friendly, creative, open to constructive criticism;

- mastering the discipline involves mandatory attendance of lectures and laboratory classes, as well as independent work;

- independent work involves the study of individual topics of the academic discipline, which are presented in accordance with the program for independent study, or were considered briefly;
– all tasks provided by the program must be completed within the set time;
- if the student of higher education is absent from classes for a good reason, he presents the completed tasks during independent preparation and consultation of the teacher;
- while studying the course, students of higher education must adhere to the rules of academic integrity set forth in the following documents: "Rules of academic integrity of participants in the educational process of the KHNADU"
(https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_dobroch_1.pdf),
"Academic integrity. Checking the text of academic, scientific and qualification works for plagiarism"
(https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_85_1_01.pdf),
"Moral and ethical code of participants in the educational process of the Khnadu"
(https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_MEK_1.pdf).
- in case of detection of plagiarism, the applicant receives 0 points for the task and must repeat the tasks provided for in the syllabus;
- write-offs during tests and assessments are prohibited (including using mobile devices). Mobile devices are allowed to be used only during online testing.

Recommended Books:

1. Global energy-ecological-climatic problems and the urgency of their solution: textbook / P.M. Kanylo, A.M. Turenko, A.V. Hrytsenko, N.V. Vnukova - Kharkiv: KHNADU, 2020 - 388 p.
2. Horun M.V., Pyrig G.I., Faifura V.V., Fedirko M.M. Ecology: a study guide. – Ternopil: Economic opinion, 2019. – 156 p.
3. M.O. Klymenko. Technoecology: a textbook / M.O. Klymenko, I.I. Zaleskyi; Ministry of Education and Science of Ukraine, National University of Water Management and Nature Management. - Stereotypical type. – Kherson: ALDI-PLUS, 2020. – 347 p.
4. Yu.V. Nosachova Environmental safety of engineering activity: a textbook for students studying engineering specialties / Yu.V. Nosachova, O.I. Ivanenko, V.V. Vember; Ministry of Education and Science of Ukraine, National Technical University of Ukraine "Kyivsk. polytechnic Institute named after I. Sikorsky". - K.: Condor, 2020. - 212 p.
5. Radovenchik V.M. Waste disposal and recovery: textbook / V.M. Radovenchyk, M. D. Gomelya, Ya. V. Radovenchyk. - K.: Condor, 2021. - 247 p.
6. Stankevich S.V. Technoecology: teaching. manual / S.V. Stankevich, L.V. Golovan; Kharkiv. national agrarian University named after VV Dokuchaeva. - Kharkiv: I.S. Ivanchenko Publishing House, 2020. - 338 p.
7. Transport ecology / O.I. Zaporozhets, S.V. Boychenko, O.L. Matveeva - K.: NAU, 2017. - 507 p.
8. Trus, I.M. Ecological aspects of environmental quality management: textbook / I.M. Trus, Ya.V. Radovenchyk, M.D. Gomelya; Ministry of Education and Science of Ukraine, National Technical University of Ukraine "Kyivsk. polytechnic Institute named after I. Sikorsky". - K.: Condor, 2020. - 208 p.

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