(F 03. 02-92)

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL AVIATION UNIVERSITY
Faculty of Architecture, Civil Engineering and Design
Computer Technologies of Airport Construction and Reconstruction Department

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"26" 10 2022

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Vice Rector for Academics
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"31" 10 2022

Quality Management System

COURSE TRAINING PROGRAM
on
"Ecodesign"

Field of study: 19 "Architecture and Construction"
Specialty: 192 "Building and Civil Engineering"
Educational-Professional Program: "Industrial and Civil Engineering"

Form of training	Sem.	Total (hours/ ECTS credits))	Lec.	Prac.	Lab.	Self-study	Homeworks, control (home) works	CP/TP	Form of control
Full-time	4	120,0/4,0	17	34	-	69	–	-	differential test 4th semester
Part-time	4, 5	120/4,0	4	8	-	108	h.w. – 5s	-	differential test 5th semester

Indices: CB-5-192-1/21-3.4
CB-5-192-1p/21-3.4

The Course Training Program on "Ecodesign" is developed on the basis of the Educational-Professional Program "Industrial and Civil Engineering", Bachelor Curriculum and Extended Curriculum № CB-5-192-1/21, № ECB-5-192-1/21, № CB-5-192-1p/21, № ECB-5-192-1p/21 for training higher education seekers of the Bachelor degree of specialty 192 "Building and Civil Engineering" and corresponding normative documents.

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Minutes № 12 of 25.10.2022.

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"28" 10 2022

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CONTENTS

Introduction..... 4

1. Explanatory Note..... 4
1.1. Role, goal and objectives of the academic discipline..... 4
1.2. Educational outcomes of the academic discipline 4
1.3. Competences obtained through the academic discipline 5
1.4. Interdisciplinary links 5

2. Program of the academic discipline.....5
2.1. Content of the academic discipline.....5
2.2. Module structure and integrated requirements for each module.....6
2.3. Thematic plan..... 7
2.4. Task for control (home) work..... 9
2.5. List of questions for final test 9

3. Training materials for the discipline 9
3.1. Teaching methods 9
3.2. Recommended literature (basic and additional literature) 9
3.3. Internet information resources 10

4. Rating System of knowledge and skills assessment 11

INTRODUCTION

The Course Training Program of the academic discipline "Ecodesign" was developed on the basis of the "Methodological recommendations for the development and execution of the syllabus of educational discipline of full-time and part-time forms of training", approved by rector's order No. 249/roz. of 29.04.2021 and relevant regulatory documents.

1. EXPLANATORY NOTE

1.1. Role, goal and objectives of the academic discipline

The role of the discipline in the field of science and the system of professional training is determined by knowledge and ability to navigate in the system of values that meet the requirements of modern production and trends in world design in terms of sustainable development.

The special significance of the discipline lies in the integrated approach to the study and research of the natural and anthropogenic environment, determining the basic conditions and factors that influence the formation of a safe living environment. Knowledge of the ecological principles of nature management and their appropriate use in the process of architectural activities will provide an opportunity to determine a system of targeted decisions on the organization of the architectural environment. Discipline forms the complex nature of the skills of the future specialist.

The goal the discipline "Ecodesign" is to get acquainted with the ecological foundations of creating an environment safe for human life, the ability to use this knowledge in project development and to form in future professionals the complex nature of skills and knowledge.

The objectives of the discipline are:

- be able to research and take into account environmental requirements for design objects;
- be able to apply modern environmental knowledge to effectively solve creative problems in the design of architectural environments;
- be able to independently investigate the effectiveness of the use of environmentally friendly building structures and materials;
- correctly use the provisions of current regulations to take into account environmental requirements in the implementation of projects

1.2. Educational outcomes of the academic discipline

The results of studying the discipline are the following program ***learning outcomes:***

As a result of studying the discipline, the specialist must know the methods and rules of construction of buildings and structures, taking into account the peculiarities of ecodesign and the requirements of sustainable development.

PLO1 – Apply basic theories, methods, and principles of mathematical, natural, social, humanistic, and economic sciences, modern models, methods, and decision-making support software to solve complex construction and civil engineering problems.

1.3. Competencies obtained through the academic discipline

Competencies that are formed when studying the subject:

Integral Competence (IC): The ability to solve complex specialized tasks and practical problems in the field of construction or in the learning process, which involves the application of theories and methods of determining the strength, stability, durability, reliability and safety of buildings and structures; application of information technologies, software complexes, automated design systems.

General Competences (GC)

GC1 – Ability to think abstractly, analyze and synthesize.
GC2 – Knowledge and understanding of the subject area and professional activity.
GC7 – Interpersonal skills.
GC8 – Ability to communicate with members of other professional groups at different levels (with experts from other fields of knowledge/types of economic activity).

Professional competencies (PC):

PC1 – Ability to use conceptual scientific and practical knowledge of mathematics, chemistry and physics to solve complex practical problems in construction and civil engineering.
PC2 – Ability to critically understand and apply basic theories, methods and principles of economics and management for rational organization and management of construction production.

1.4. Interdisciplinary links

This discipline is based on knowledge of the following disciplines: "Introduction to Construction", "Building Mechanics", "Building Materials Science" and is the basis for studying the following disciplines, such as: "Building Structures", "Architecture of Buildings and Structures", qualification work .

2. PROGRAM OF THE ACADEMIC DISCIPLINE

2.1. Content of the academic discipline

The educational material of the discipline is structured on a modular basis and consists of the 1st educational module, namely:

- **educational module 1** "Environmental aspects of the environment" which are logically complete, independent, integral part of the curriculum, the assimilation of which involves a modular test and analysis of the results of its implementation.

2.2. Module structure and integrated requirements for each module

Module №1 "Ecological aspects of environmental formation"
Integrated requirements for module 1
to know:
- the essence of ecodesign;
- requirements for projects to ensure environmental protection;
- environmental requirements for building structures;
- environmental requirements for spatial planning solutions of buildings and structures;

be able
- to carry out functional, morphological, economic analysis of the object;
- analyze the pre-project situation;
- to develop the concept of the ecodesign object, guided by functional, technological, technical and economic, ergonomic and aesthetic factors;
- to determine the three-dimensional compositional solution of the ecodesign object in accordance with the found conceptual solution, stylistic orientation and artistic image;
- use techniques to enhance creative thinking;
- to identify compliance of the form with the constructive basis, logic and tectonics, ergonomic requirements;
- reflect the morphological, stylistic and color-texture properties of design objects;
- perform working and presentation documentation.

Topic 1. Introduction. The place of the discipline in the system of training a design specialist. Terminology and definitions of basic concepts. The essence of ecodesign. Origins and main stages of ecodesign. The evolution of ecological knowledge and their impact on architectural and urban planning activities in the formation of a full-fledged environment for human life. Historical stages. Features of modern ecodesign development. Trends.

Topic 2. Ecology and architectural environment. The concept of "environment", its understanding in various fields of scientific knowledge. Natural environment. Anthropogenic environment. The concept of "sustainable development of society" The concept of sustainable development in international documentation. The main goal of architecture and urban planning is to create an optimal environment for human life. Environment as an object of activity.

Topic 3. Environmental aspects of urban planning. Urban settlements, their role in the development of society and the individual. Features of the urban ecosystem. The structure of factors influencing the formation of the urban environment. Natural factors, anthropological, natural and man-made factors. The concept of "ecological framework of the city", its importance in the sustainable development of urban settlements. Formation of ecologically safe urban areas. Classification of environmental requirements for the design of urban areas. Regulatory support. Features of eco-design in different regions.

Topic 4. Environmental requirements for buildings and structures. Classification of environmental requirements for spatial planning solutions of buildings. Environmental requirements for building structures. Regulatory support. Environmental requirements for materials. The concept of environmental - "clean" materials.

Topic 5. Management of environmental safety in the formation of the architectural environment. Landscaping. Requirements for environmental protection projects. Substantive provisions. Preservation of historical and cultural heritage. Responsible consumption and production. Inclusive environment.

Topic 6. Transport. Biodesign. Environmentally friendly modes of transport. The process of obtaining energy. Formation.

Topic 7. Ecodesign in the interior. The concept of the phenomenon of "urbanization", the problem of interior design, stylistic trends, the creation or revitalization of the microclimate of the health center, bringing it closer to wildlife; creating an interior, the style of which would be more natural, one that relieves emotional tension and restores a positive mood, carries a psychological relief. Methods and techniques for creating an optimal microclimate in residential and public buildings.

Topic 8. Eco-trends in furniture design. Interaction of product design and shape. Features of visual perception of materials. The concept of manufacturability of the product. Standardization, unification, normalization.

2.3. Thematic plan of the academic discipline

№ п/п	Topic	Academic hours							
		Full-time study				Part-time study			
		Total	Lectures	Practicals	Self-study	Total	Lectures	Practicals	Self-study
1	2	3	4	5	6	7	8	9	10
Module №1 "Elements of metal structures and their welding"									
1.1	**Introduction. The place of the discipline in the system of training a design specialist. Terminology and definitions of basic concepts**. The essence of ecodesign. Origins and main stages of ecodesign. The evolution of ecological knowledge and their impact on architectural and urban planning activities in the formation of a full-fledged environment for human life. Historical stages.	**4 semester**				**4 semester**			
		9	2	2	5	10	2	2	6
1.2	Features of modern ecodesign development. Trends.	6	-	2	4	6	-	-	6
1.3	**Ecology and architectural environment.** The concept of "Sustainable Development of Society". The concept of sustainable development in international documentation	8	2	2	4	6	-	-	6
1.4	The main goal of architecture and urban planning is to create an optimal environment for human life. Environment as an object of activity.	6	-	2	4	8	-	2	6
1.5	Environmental aspects of urban planning. Urban settlements, their role in the development of society and the individual. Features of the urban ecosystem. The structure of factors influencing the formation of the urban environment. Natural factors, anthropological, natural and man-made	8	2	2	4	**5 semester**			
						10	2	2	6

1	2	3	4	5	6	7	8	9	10
	factors. The concept of "ecological framework of the city", its importance in the sustainable development of urban settlements.								
1.6	Formation of ecologically safe urban areas. Classification of environmental requirements for the design of urban areas. Regulatory support. Features of eco-design in different regions.	7	-	2	5	6	-	-	6
1.7	**Environmental requirements for buildings and structures** Classification of environmental requirements for spatial planning solutions of buildings. Environmental requirements for building structures. Regulatory support.	8	2	2	4	6	-	-	6
1.8	Environmental requirements for building materials. The concept of environmental - "pure" materials.	6	-	2	4	6	-	-	6
1.9	**Management of environmental safety in the formation of the architectural environment. Landscaping.** Requirements for environmental protection projects. Substantive provisions. Preservation of historical and cultural heritage.	8	2	2	4	6	-	-	6
1.10	Responsible consumption and production. Inclusive environment.	6	-	2	4	6	-	-	6
1.11	**Transport.** Environmentally friendly modes of transport. Energy production processes.	8	2	2	4	6	-	-	6
1.12	**Biodesign.** Formation.	8	2	2	4	6	-	-	6
1.13	**Ecodesign in the interior.** The concept of the phenomenon of "urbanization", the problem of interior design, stylistic trends, the creation or revitalization of the microclimate of the health center, bringing it closer to wildlife; creating an interior, the style of which would be more natural, one that relieves emotional tension and restores a positive mood, carries a psychological relief.	6	-	2	4	6	-	-	6
1.14	Methods and techniques for creating an optimal microclimate in residential and public buildings.	8	2	2	4	6	-	-	6
1.15	**Eco-trends in furniture design.** Interaction of product design and shape. Features of visual perception of materials. The concept of manufacturability of the product.	5	-	2	3	6	-	-	6

1	2	3	4	5	6	7	8	9	10
1.16	Standardization, unification, normalization.	5	1	2	2	6	-	-	6
1.17	**Home assignments execution**	**-**	**-**	**-**	**-**	**6**	**-**	**-**	**6**
1.18	**Module test №1**	**8**	**-**	**2**	**6**	**-**	**-**	**-**	**-**
1.19	**Control (home) work (PTS)**	**-**	**-**	**-**	**-**	**8**	**-**	**2**	**6**
Total for Module 3		**120**	**17**	**34**	**69**	***120***	***4***	***8***	***108***
Total for Academic Discipline		**120**	**17**	**34**	**69**	***120***	***4***	***8***	***108***

2.4. Task for control (home) work

Control (homework) in the discipline is performed in the fifth semester, in accordance with the approved methodological recommendations, in order to consolidate and deepen the theoretical knowledge and skills of the student in the study of the discipline. The task for the practical part of the control (home) task is carried out by the student individually in accordance with the guidelines.

2.5. List of questions for final test

The list of questions and the tasks to prepare for the exam are developed by the teacher of the department in accordance with the work program and communicated to the students.

3. TRAINING MATERIALS FOR THE DISCIPLINE

3.1. Teaching Methods

When studying the discipline, the following teaching methods are used:
- explanatory-illustrative method;
- method of problem statement;
- design method;
- creative, partial-search methods;
- reproductive methodж
- research method.

The implementation of these methods is carried out during lectures, demonstrations, independent work, work with educational literature, solving problems in building design.

3.2. Recommended literature

Basic literature

3.2.1. Шемсединов Г. І. Проектування мобільних будівель. Навчальний посібник. – К.: КНУБА, 2007. – 144 с.

3.2.2. Маслов Н.В. Градостроительная экология. – М.: Архитектура – 2002.– 443 с.

3.2.3. Демин Н.М. Управление развитием градостроительных систем. – К.: Стройиздат, 1991.– 156 с.

3.2.4. ДБН 360-92** Містобудування. Планування і забудова міських і сільських поселень. – К.: Мінбуд України, 2002. – 80 с.

3.2.5. ДБН В.2.6-31:2006 Конструкції будівель та споруд. Теплова ізоляція будівель. – К.: Міністерство будівництва, архітектури та житлово-комунального господарства УКРАЇНИ. – 44 с.

3.2.6. Державні санітарні правила планування та забудови населених пунктів, затверджені наказом Міністерства охорони здоров'я України від 19.06.1996 № 173.

3.2.7. Білявський Г.О. Основи Екології. Навчальний посібник / К.: Либідь, 2006.-408 с.

3.2.8. Екологічні проблеми формування архітектурного середовища: З 63 конспект лекцій/ О.С. Зінов'єва, Ю.С. Рябець. – К.: КНУБА, 2013. – 32 с.

3.2.9. Архітектурна екологія: конспект лекцій / Г. М. Юрчишин, У. Б. Полутренко. - Івано-Франківськ: ІФНТУНГ, 2014. - 106 с.

3.2.10. Казанцев П.А. Основы экологической архитектуры и дизайна. Экспериментальный лекционный и практический курс для студентов специальностей Архитектура и ―Дизайн архитектурной среды: альбом проектов: учебное пособие. — Владивосток: Изд-во ДВГТУ, 2008. - 118с.

3.2.11. Экодом. Энергосберегающие технологии в строительстве. / О. С. Дьяченко // Вісник Придніпровської державної академії будівництва та архітектури. - Днепропетровск: ПГАСА, 2011. - № 5. - С. 55 - 60.

Additional literature

3.2.12. Містобудування: Довідник проектувальника /за ред. Т.Ф.Панченко. – К.: Вища школа, 2001.– 251 с.

3.2.13. Передельский Л.В., Приходченко О.Е. Строительная экология. – Ростов-на-Дону: Наука, 2010.– 382 с.

3.2.14. Реймерс Н.Ф. Экология (теории, законы, правила, принципы и гипотезы). – М.: Стройиздат, 2005.– 521 с.

3.3. Internet information resources

3.3.1. Репозитарій кафедри дизайну інтер'єру https://er.nau.edu.ua/handle/NAU/9116

3.3.2. http://www.archdaily.com/

3.3.3. Цілі сталого розвитку https://sdgs.un.org/ru/goals
та https://drive.google.com/file/d/1k0lOTeNWnzB_pSTtwMAsM2JS_kGU59Tc/view

3.3.4. https://www.evolo.us/category/competition/

3.3.5. ttps://www.youtube.com/watch?v=4w7lsydq8ks

3.3.6. https://www.youtube.com/watch?v=sw9zpH717ts Flexible Buildings: The Future of Architecture | Free Documentary

3.3.7. City of the Future: Singapore – Full Episode | National Geographic https://www.youtube.com/watch?v=xi6r3hZe5Tg

3.3.8. Why New York's Billionaires' Row Is Half Empty https://www.youtube.com/watch?v=Wehsz38P74g

3.3.9. Manhattan's skyscrapers aren't really built for people anymore. http://ow.ly/GxW7y

4. RATING SYSTEM OF KNOWLEDGE AND SKILLS ASSESSMENT

4.1. Evaluation of certain types of work done by students of the points made in accordance with Tables.4.1.

Table 4.1.

Kind of Academic Activities	Maximum Grade	
	Full-time study	**Part-time study**
	Module №1	
	4 semester	**-**
Carrying out and Defending the practicals	5×15 = 75	-
For carrying out a module test 1 a student must receive not less than	*55*	-
Carrying out a module test №1	25	-
Carrying out the control (home) work	-	-
Total for academic discipline	**100**	

A Semester Grade is determined (in points and in the National Scale) as a result of performing all kinds of educational work during the semester.

4.2. Completed types of educational work are credited to the student, if he received a positive rating for them *(Appendix 3).*

4.3. The sum of ratings received by the student for certain types of completed educational work is the current modular rating, which is recorded in the module control.

4.4. In the case of differentiated test, the final semester rating is converted into a grade on the national scale and the ECTS scale *(Annex 5).*

4.5. The final semester rating in points, on the national scale and the ECTS scale is entered in the test report, study card and student record book, for example, as follows: ***92 / Excellent / A, 87 / Good / B, 79 / Good / C, 68 / Set / D, 65 / Set / E, etc.***

4.6. The final rating in the discipline is equal to the final semester rating. The specified final rating in the discipline is entered in the Diploma Supplement.

(Ф 03.02 – 01)

АРКУШ ПОШИРЕННЯ ДОКУМЕНТА

№ прим.	Куди передано (підрозділ)	Дата видачі	П.І.Б. отримувача	Підпис отримувача	Примітки

(Ф 03.02 – 02)

АРКУШ ОЗНАЙОМЛЕННЯ З ДОКУМЕНТОМ

№ пор.	Прізвище ім'я по-батькові	Підпис ознайомленої особи	Дата ознайом-лення	Примітки

(Ф 03.02 – 04)

АРКУШ РЕЄСТРАЦІЇ РЕВІЗІЇ

№ пор.	Прізвище ім'я по-батькові	Дата ревізії	Підпис	Висновок щодо адекватності

(Ф 03.02 – 03)

АРКУШ ОБЛІКУ ЗМІН

№ зміни	№ листа (сторінки)				Підпис особи, яка внесла зміну	Дата внесення зміни	Дата введення зміни
	Зміненого	Заміненого	Нового	Анульо-ваного			

(Ф 03.02 – 32)

УЗГОДЖЕННЯ ЗМІН

	Підпис	Ініціали, прізвище	Посада	Дата
Розробник				
Узгоджено				
Узгоджено				
Узгоджено				