

**Ministry of Education and Science of Ukraine
Dnipro University of Technology**

Department of Construction, Geotechnics and Geomechanics

«APPROVED»

Head of Department

Hapiev Serhii

«02» July 2019

ACADEMIC DISCIPLINE WORK PROGRAM

«Architecture of buildings and structures»

Field of study	19 Architecture and Construction
Specialty	192 Building and Civil Engineering
Academic degree	Bachelor
Educational and vocational training program	192 Building and Civil Engineering
Type of discipline	Basic
Total workload	9 credits ECTS (270 hours)
Type of final assessment	exam
Period of study	4-th semester (7,8 quarters)
Language of study	English

Lecturers: Ass. Prof. Khoziaikina Nataliia

Prolonged: for 20__ / 20__ academic year _____ (_____) " __ " 20__.

(Signature, name, date)

for 20__ / 20__ academic year _____ (_____) " __ " 20__.

(Signature, name, date)

Dnipro
DUT
2019

Academic discipline work program «Architecture of buildings and structures» for Bachelor's program **192 Building and Civil Engineering** / N. Khoziaikina / Dnipro University of Technology, Department of CGG – D.: DUT, 2019. – 12 c.

Authors: – Khoziaikina Nataliia

The work program regulates:

- key goals and objectives;
- the disciplinary learning outcomes generated through the transformation of the intended learning outcomes of the degree program;
- the content of the discipline formed according to the criterion “disciplinary learning outcomes”;
- the discipline program (thematic plan by different types of classes);
- distribution of the discipline workload by different types of classes;
- an algorithm for assessing the level of achievement of disciplinary learning outcomes (scales, tools, procedures and evaluation criteria);
- criteria and procedures for evaluating the academic achievements of applicants by discipline;
- the contents of the educational and methodological support of the discipline.

The work program is designed to implement a competency approach in planning an education process, delivery of the academic discipline, preparing students for control activities, controlling the implementation of educational activities, internal and external quality assurance in higher education, accreditation of degree programs within the specialty.

Approved by the decision of the Methodical Commission of specialty **192 Building and Civil Engineering** (record №7 by 01.07.2019).

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1 DISCIPLINE OBJECTIVES

In the educational and professional programs of the Dnipro University of Technology specialty 192 Building and Civil Engineering, the distribution of program learning outcomes (PLO) for the organizational forms of the educational process is done. In particular, the following learning outcomes are attributed to the discipline Φ1 “Architecture of buildings and structures”:

PH7	Use and develop technical documentation, including the use of modern information technology.
PH9	Create or apply spatial planning solutions for further design, including the use of information technology.
PH12	To develop constructive decisions of the object of construction on the basis of knowledge of the nomenclature and constructive forms, ability to calculate and construct building constructions and knots of their connection.
PH14	Adhere to modern requirements of regulatory documents in the construction industry.

The objective of discipline – to form students' knowledge of basic principles of architectural and constructive solution of buildings, general information about buildings and their basic structural elements taking into account technological, technical, modern architectural requirements.

The implementation of the objective requires transforming program learning outcomes into the disciplinary ones as well as an adequate selection of the contents of the discipline according to this criterion.

2 INTENDED DISCIPLINARY LEARNING OUTCOMES

PLO code	Disciplinary learning outcomes (DLO)	
	PLO code	content
PH7	PH7-1	Classify buildings and structures by functional purpose. Classify residential buildings. Understand the state building codes of the country.
PH9	PH9-1	Distinguish the principles of architectural and structural design of buildings, their elements, taking into account technological, technical, architectural and artistic requirements.
PH12	PH12-1	Find the optimal spatial planning solution for buildings. Effectively plan constructive solutions for residential and industrial buildings.
PH14	PH14-1	Know the service life of structures and elements of residential buildings and the classification of the building by the degree of fire resistance.

3 BASIC DISCIPLINES

Subjects	The acquired learning outcomes
Φ6 Engineering and computer graphics	Use of skills of development of the technical documentation necessary for representation of technical decisions by means of drawings in the automated CAD systems and rules of their registration according to the international system of standards of ESPD (Unified system of program documentation); Using modern computer technology, the ability to build graphical models of engineering, such as drawings, spatial models, visual images, diagrams, elements of computer graphics, etc.
Φ3 Construction material science	Ability to effectively apply modern building materials, products and structures based on knowledge of their technical characteristics and manufacturing technology.
Φ7 Information and communication support of engineering activities	Demonstrate skills of oral and written communication in state and foreign languages, using the skills of interpersonal interaction, working in an international context with specialists and non-specialists in the field, using modern means of communication.
Φ5 Engineering geodesy; Educational practice in geodesy;	Demonstrate the ability to work with geodetic instruments and use topographic materials to design and build construction sites and engineering networks.

4 WORKLOAD DISTRIBUTION BY THE FORM OF EDUCATIONAL PROCESS ORGANIZATION AND TYPES OF CLASSES

Type of classes	Workload hours	Distribution by forms of education, hours					
		Full-time		Part-time		Distance	
		Classes (C)	Individual work (IW)	Classes (C)	Individual work (IW)	Classes (C)	Individual work (IW)
lecture	90	34	56				
practical	90	34	56				
laboratory	90	34	56				
TOTAL	270	102	168				

5 DISCIPLINE PROGRAM BY TYPES OF CLASSES

PLO code	Types and topics of training sessions	Volume of components, hours
	Lectures	90
PH7-1	The essence of architecture and its tasks. The concept of architecture. General information about houses and buildings. Requirements for buildings and their elements. Technical feasibility of the house. Basic elements and constructive schemes of residential buildings. Structural elements of buildings. Foundations and foundations, walls. Floor and floor. Roof.	22
PH9-1	Classification of buildings by functional purpose. Civil and industrial buildings. Regulations. Public buildings and structures. Classification of residential and industrial buildings.	22

PLO code	Types and topics of training sessions	Volume of components, hours
PH12-1	Service life of designs and elements of apartment houses. Classification of buildings according to the degree of fire resistance. Industrialization of construction. Unification, typification, and standardization. Stiffness diaphragm.	24
PH14-1	High-rise (multi-storey) buildings. Building tilt. Long-span structures. Coverage of long-span buildings. Collapse of long-span buildings.	22
	Practical classes	90
PH7-1 PH9-1 PH12-1	General elements and structural schemes of residential buildings. Study and discussion of the concept of the frame of a residential building (on the example of specific modern buildings). Civil buildings, their architectural constructions. Study and seminar discussion (on the example of specific modern buildings).	10
PH7-1	Calculation of technical and economic indicators of the building	10
PH14-1	Reports, multimedia presentation and discussion on the topic: multi-storey buildings. Reports, multimedia presentation and discussion on the topic: long-span structures. Reports, multimedia presentation and discussion on the topic: covering of long-span buildings. Reports, multimedia presentation and discussion on the topic: collapse of long-span buildings. Reports, multimedia presentation and discussion on the topic: environmentally sustainable architecture. Reports, multimedia presentation and discussion on the topic: abandoned buildings and structures. Renovations of civil / industrial facilities.	70
	Laboratory classes	90
PH7-1 PH9-1 PH12-1	Planning elements of the apartment. Functional zoning of the apartment. Thermal calculation of enclosing structures. Calculation of the airborne noise insulation index of a single-layer enclosing structure. Construction of building plans. Selection of window and door elements; calculation of technical and economic indicators.	30
PH7-1 PH9-1 PH12-1	Scheme of the building. Construction of the project card. Construction of sections of the building. Construction of stairs.	20
PH7-1 PH9-1 PH12-1	Construction of fragments of facades. Construction of building facades. Development of foundation structures. Plan of the roof of the building.	20
PH7-1 PH9-1 PH12-1	Development of architectural plans. Development of architectural sections and facades	20
TOTAL		270

6 KNOWLEDGE PROGRESS TESTING

Certification of student achievement is accomplished through transparent procedures based on objective criteria in accordance with the University Regulations “On Evaluation of Higher Education Applicants' Learning Outcomes”.

The level of competencies achieved in relation to the expectations, identified during the control activities, reflects the real result of the student's study of the discipline.

6.1 GRADING SCALES

Assessment of academic achievement of students of the Dnipro University of Technology is carried out based on a rating (100-point) and institutional grading scales. The latter is necessary (in the official absence of a national scale) to convert (transfer) grades for mobile students.

The scales of assessment of learning outcomes of the NTUDP students

Rating	Institutional
90 ... 100	Excellent
74 ... 89	Good
60 ... 73	Satisfactory
0 ... 59	Failed

Discipline credits are scored if the student has a final grade of at least 60 points. A lower grade is considered to be an academic debt that is subject to liquidation in accordance with the Regulations on the Organization of the Educational Process of NTUDP.

6.2 DIAGNOSTIC TOOLS AND EVALUATION PROCEDURES

The content of diagnostic tools is aimed at controlling the level of knowledge, skills, communication, autonomy, and responsibility of the student according to the requirements of the National Qualifications Framework (NQF) up to the 7th qualification level during the demonstration of the learning outcomes regulated by the work program.

During the control activities, the student should perform tasks focused solely on the demonstration of disciplinary learning outcomes (Section 2).

Diagnostic tools provided to students at the control activities in the form of tasks for the intermediate and final knowledge progress testing are formed by specifying the initial data and a way of demonstrating disciplinary learning outcomes.

Diagnostic tools (control tasks) for the intermediate and final knowledge progress testing are approved by the appropriate department.

Type of diagnostic tools and procedures for evaluating the intermediate and final knowledge progress testing are given below.

Diagnostic and assessment procedures

INTERMEDIATE CONTROL			FINAL ASSESSMENT	
training sessions	diagnostic tools	procedures	diagnostic tools	procedures
lections	control tasks for each topic	task during lectures	comprehensive reference work (CRW)	determining the average results of intermediate controls;
practical	control tasks for each topic	tasks during practical classes		CRW performance during the examination at the request of the student
	or individual task	tasks during independent work		

During the intermediate control, the lectures are evaluated by determining the quality of the performance of the control specific tasks. Practical classes are assessed by the quality of the control or individual task.

If the content of a teaching activity is subordinated to several descriptors, then the integral value of the assessment may be determined by the weighting coefficients set by the lecturer.

Provided that the level of results of the intermediate controls of all types of training at least 60 points, the final control can be carried out without the student's immediate participation by determining the weighted average value of the obtained grades.

Regardless of the results of the intermediate control, every student during the final knowledge progress testing has the right to perform the CRW, which contains tasks covering key disciplinary learning outcomes.

The number of specific tasks of the CRW should be consistent with the allotted time for completion. The number of CRW options should ensure that the task is individualized.

The value of the mark for the implementation of the CRW is determined by the average evaluation of the components (specific tasks) and is final.

The integral value of the CRW performance assessment can be determined by considering the weighting factors established by the department for each NQF descriptor.

6.3 EVALUATION CRITERIA

The actual student learning outcomes are identified and measured against what is expected during the control activities using criteria that describe the student's actions to demonstrate the achievement of the learning outcomes.

To evaluate the performance of the control tasks during the intermediate control of lectures and practical the assimilation factor is used as a criterion, which automatically adapts the indicator to the rating scale:

$$O_i = 100 a / m,$$

where a - number of correct answers or significant operations performed according to the solution standard; m - the total number of questions or substantial operations of the standard.

Individual tasks and complex control works are expertly evaluated using criteria that characterize the ratio of competency requirements and evaluation indicators to a rating scale.

The content of the criteria is based on the competencies identified by the NQF for the Bachelor's level of higher education (given below).

Integral competence is the ability to solve complex problems and specialized practical problems in area of professional activities or in a learning process that involves the use of certain theories and methods of the relevant scientific areas and characterized by complexity and conditions uncertainty.

NQF descriptors	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
Knowledge		
<ul style="list-style-type: none"> Conceptual knowledge acquired during the training and professional activities, including some knowledge of modern achievements; critical understanding of the main theories, principles, methods, and concepts in education and careers 	- A great - proper, reasonable, sensible. Measures the presence of: - conceptual knowledge; - a high degree of state ownership issues; - critical understanding of the main theories, principles, methods and concepts in education and careers	95-100
	A non-gross contains mistakes or errors	90-94
	The answer is correct but has some inaccuracies	85-89
	A correct some inaccuracies but has also proved insufficient	80-84
	The answer is correct but has some inaccuracies, not reasonable and meaningful	74-79
	A fragmentary	70-73
	A student shows a fuzzy idea of the object of study	65-69
	Knowledge minimally satisfactory	60-64
	Knowledge unsatisfactory	<60
Ability		
<ul style="list-style-type: none"> solving complex problems and unforeseen problems in specialized areas of professional and/or training, which involves the collection and interpretation of information (data), choice of methods and tools, the use of 	- The answer describes the ability to: <ul style="list-style-type: none"> - identify the problem; - formulate hypotheses; - solve problems; - choose adequate methods and tools; - collect and interpret logical and understandable information; - use innovative approaches to solving the problem 	95-100
	The answer describes the ability to apply knowledge in practice with no blunders	90-94
	The answer describes the ability to apply knowledge in	85-89

NQF descriptors	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
innovative approaches	practice but has some errors in the implementation of a requirement	
	The answer describes the ability to apply knowledge in practice but has some errors in the implementation of the two requirements	80-84
	The answer describes the ability to apply knowledge in practice but has some errors in the implementation of the three requirements	74-79
	The answer describes the ability to apply knowledge in practice but has some errors in the implementation of the four requirements	70-73
	The answer describes the ability to apply knowledge in practice while performing tasks on the model	65-69
	A characterizes the ability to apply knowledge in performing tasks on the model, but with uncertainties	60-64
	The level of skills is poor	<60
Communication		
♦ report to specialists and non-specialists of information, ideas, problems, solutions and their experience in the field of professional activity; ♦ the ability to form an effective communication strategy	- Fluent problematic area. Clarity response (report). Language - correct; - - net; - - clear; - - accurate; - - logic; - - expressive; - - concise. Communication strategy: coherent and consistent development of thought; availability of own logical reasoning; relevant arguments and its compliance with the provisions defended; the correct structure of the response (report); correct answers to questions; appropriate equipment to answer questions; the ability to draw conclusions and formulate proposals	95-100
	Adequate ownership industry issues with minor faults. Sufficient clarity response (report) with minor faults. Appropriate communication strategy with minor faults	90-94
	Good knowledge of the problems of the industry. Good clarity response (report) and relevant communication strategy (total three requirements are not implemented)	85-89
	Good knowledge of the problems of the industry. Good clarity response (report) and relevant communication strategy (a total of four requirements is not implemented)	80-84
	Good knowledge of the problems of the industry. Good clarity response (report) and relevant communication strategy (total not implemented the five requirements)	74-79
	Satisfactory ownership issues of the industry. Satisfactory clarity response (report) and relevant communication strategy (a total of seven requirements not implemented)	70-73

NQF descriptors	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
	Partial ownership issues of the industry. Satisfactory clarity response (report) and communication strategy of faults (total not implemented nine requirements)	65-69
	The fragmented ownership issues of the industry. Satisfactory clarity response (report) and communication strategy of faults (total not implemented 10 requirements)	60-64
	The level of poor communication	<60
Autonomy and responsibility		
<ul style="list-style-type: none"> ♦ management actions or complex projects, responsible for decision-making in unpredictable conditions; ♦ responsible for the professional development of individuals and/or groups ♦ the ability to continue study with a high degree of autonomy 	<ul style="list-style-type: none"> - Excellent individual ownership management competencies focused on: <ol style="list-style-type: none"> 1) management of complex projects, providing: <ul style="list-style-type: none"> - exploratory learning activities marked the ability to independently evaluate various life situations, events, facts, detect and defend a personal position; - the ability to work in a team; - control of their own actions; 2) responsibility for decision-making in unpredictable conditions, including: <ul style="list-style-type: none"> - justify their decisions the provisions of the regulatory framework of sectoral and national levels; - independence while performing tasks; - lead in discussing problems; - responsibility for the relationship; 3) responsible for the professional development of individuals and/or groups that includes: <ul style="list-style-type: none"> - use of vocational-oriented skills; - the use of evidence from independent and correct reasoning; - possession of all kinds of learning activities; 4) the ability to further study with a high degree of autonomy, which provides: <ul style="list-style-type: none"> - degree possession of fundamental knowledge; - independent evaluation judgments; - high level of formation of general educational skills; - search and analysis of information resources 	95-100
	Confident personality possession competency management (not implemented two requirements)	90-94
	Good knowledge management competencies personality (not implemented three requirements)	85-89
	Good knowledge management competencies personality (not implemented the four requirements)	80-84
	Good knowledge management competencies personality (not implemented six requirements)	74-79
	Satisfactory ownership of individual competence management (not implemented seven requirements)	70-73
	Satisfactory ownership of individual competence management (not implemented eight claims)	65-69
	The level of autonomy and responsibility fragmented	60-64
	The level of autonomy and responsibility poor	<60

7 TOOLS, EQUIPMENT, AND SOFTWARE

Technical teaching aids.

8 RECOMMENDED BIBLIOGRAPHY

1. Electronic content: "Architecture of buildings and structures": Lecture notes on the discipline. Developer Assoc. Khoziaikina N. (<https://do.nmu.org.ua/course/view.php?id=1558>)
2. Dictionary architecture & construction / Cyril M. Harris – Fourth Edition, 2006 - 1098 p.
3. Eurocode (EN 1990) - Basis of structural design: <https://www.phd.eng.br/wp-content/uploads/2015/12/en.1990.2002.pdf>
4. Eurocode 1 (EN 1991): Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings: <https://www.phd.eng.br/wp-content/uploads/2015/12/en.1991.1.1.2002.pdf>
5. Explanatory documents on the basic safety requirements established by the Council Directive EC 89/106 / EEC: https://okna.ua/library/art-evrokodi_normativno_pravove
6. ДК 018-2000. State classifier of buildings and structures. – [valid from 2001– 01 – 01]. – K.: State standard, 2000. – 53 с.
7. ДБН В.2.2-15:2019 Residential buildings. Substantive provisions.
10. ДБН В.2.2-9:2018 Public buildings and structures. Substantive provisions.
11. ДБН В.1.2-6-2008 Основні вимоги до будівель і споруд. Механічний опір та стійкість.
12. ДБН В.1.2-7-2008 Basic requirements for buildings and structures. Fire safety.
13. ДБН В.1.2-9-2008 Basic requirements for buildings and structures. Operational safety.

Educational edition

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