

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
KHARKIV NATIONAL UNIVERSITY OF CONSTRUCTION AND ARCHITECTURE

EDUCATIONAL AND SCIENTIFIC PROGRAM

“Construction and Civil Engineering”

For the third (educational and scientific) level of higher education

with a specialization in 192 Construction and Civil Engineering

subject area 19 Architecture and Construction

Qualification: Doctor of Philosophy in Technical Sciences

APPROVED BY ACADEMIC BOARD

Chairman of Academic Board

/signed/ /Yu.M. Shkodovskyi/

(Record No. 7 dated March 25, 2016)

Educational program shall become effective from September 1, 2016

Rector */signed/ /Yu.M. Shkodovskyi/*

(Order No. 103 dated April 12, 2016)

/Official Seal/: Ministry of Education and Science of Ukraine * Kharkiv National University of
Construction and Architecture * No. 02071174

PREFACE

As amended and supplemented under Regulations on Educational Programs of Kharkiv National University of Construction and Architecture approved by Resolution of Academic Board dated July 03, 2017, Record No. 12, ratified and rendered effective under Order of the Rector dated July 07, 2017 No. 177.

Elaborated by the following members of the working group:

- 1. Shumakov Ihor Valentunovych**, head of project group (guarantor of the educational program), Doctor of Technical Sciences, Professor, Head of the Department of Construction Technology, Kharkiv National University of Construction and Architecture;
- 2. Spirande Karina Vitaliivna**, member of project group, Candidate of Technical Sciences, Professor of the Department of Reinforced Concrete and Masonry Structures, Kharkiv National University of Construction and Architecture;
- 3. Fursov Vadym Viktorovych**, member of project group, Doctor of Technical Sciences, Professor, Head of the Department of Metal and Wooden Structures, Kharkiv National University of Construction and Architecture;
- 4. Weinberg Oleksandr Isaakovych**, member of project group, Doctor of Technical Sciences, Professor, Head of the Department of Hydrotechnical Construction, Kharkiv National University of Construction and Architecture;
- 5. Samorodov Oleksandr Vitaliiovych**, member of project group, Candidate of Technical Sciences, Associate Professor, Associate Professor of the Department of Geotechnics and Underground Constructions, Kharkiv National University of Construction and Architecture;
- 6. Sopov Viktor Petrovych**, member of project group, Doctor of Technical Sciences, Professor, Head of the Department of Physical-Chemical Mechanics and Technologies of Constructional Materials and Products, Kharkiv National University of Construction and Architecture;
- 7. Redko Oleksandr Fedorovych**, member of project group, Doctor of Technical Sciences, Professor of the Department of Heat and Gas Supply, Ventilation, and Waste Heat Usage, Kharkiv National University of Construction and Architecture;
- 8. Epoian Stepan Mykhaylovych**, member of project group, Doctor of Technical Sciences, Professor, Head of the Department of Water Supply, Sewerage, and Hydraulics, Kharkiv National University of Construction and Architecture;
- 9. Hrinov Volodymyr Borysovych**, member of project group, Doctor of Technical Sciences, Professor, Head of the Department of Building Mechanics, Kharkiv National University of Construction and Architecture;
- 10. Huk Valerii Ivanovych**, member of project group, Doctor of Technical Sciences, Professor, Head of the Department of Urban Studies and Urban Development, Kharkiv National University of Construction and Architecture.

I. The educational program profile for the specialization

192 Construction and Civil Engineering

1 - General information	
Full name of higher educational institution and structural unit	Kharkiv National University of Construction and Architecture. Departments of Geotechnics and Underground Constructions; Reinforced Concrete and Masonry Structures; Metal and Wooden Structures; Construction Technology; Construction Operations Management; Hydrotechnical Construction; Physical-Chemical Mechanics and Technologies of Constructional Materials and Products; Heat and Gas Supply, Ventilation, and Waste Heat Usage; Water Supply, Sewerage, and Hydraulics; Building Mechanics; Urban Studies and Urban Development
Higher education degree and name of the qualification in the source language	Доктор філософії в галузі технічних наук / Doctor of Philosophy in Technical Sciences
Official name of educational program	Construction and Civil Engineering
Type of diploma and scope of educational program	Diploma of Doctor of Philosophy, single; 240 ECTS credits; duration of training – 4 years
Availability of accreditation	Not available
Cycle/level of the program	NQF of Ukraine – level 8
Prerequisites	Master's degree or specialist's degree with the relevant major
Language of instruction	Ukrainian
Duration of educational program	Program shall be valid for 5 years from September 2016.
Internet address the educational program description is constantly published at	isod.kstuca.kharkov.ua
2 - Purpose of the Educational Program	
<p>Ensure the training of highly qualified staff in the area of construction and civil engineering, possessing the necessary competencies for professional and / or research and innovation activities, preparation and defense of the thesis.</p> <p>Postgraduate students of specialization 192 “Construction And Civil Engineering” receive the necessary theoretical knowledge, skills, proficiency, and competence sufficient for the production of new ideas, solving complex problems in the area of professional and / or research and innovation activities, mastering the methodology of scientific and pedagogical activity, as well as conducting own scientific research, the results of which have a scientific novelty, theoretical and practical significance.</p>	
3 – Specifics of the Educational Program	
Subject field (subject area, specialization, major)	<p>Objects of study and / or activity (phenomena, conditions, or problems under study):</p> <p>Influence of functional and technological processes, natural and climatic conditions and actions on the strain-stress state, operational, and environmental characteristics of structures, facilities, buildings, and their complexes.</p>

	<p>Peculiarities of the work of building materials and structures depending on the duration of technological processes in buildings and facilities, studying the objective laws of the load, characteristics of the impact on them of the environment and technological equipment during operation. Development of methods of protection against the impact of hazardous natural and man-made actions.</p> <p>Creation of rational types of constructions, assortment of products and elements, unification, typification, standardization, increase in industrialization and quality of construction. Influence of technology of manufacturing and execution of construction and installation works on constructive forms and space-planning decisions.</p> <p>Technology of designing constructions, facilities, buildings and their complexes.</p> <p>The work of structures, their behavior under load depending on the material and features of a constructive form. Development of methods for assessing the load carrying ability of structures, protection against corrosion, erosion, decay, and other types of physical damage.</p> <p>Search for rational forms of buildings, structures and facilities for their placement in the natural environment, in settlements and industrial buildings.</p> <p>Theoretical foundations and methods of construction, aimed at the development of rational architectural and planning decisions, taking into account the conditions of protection of people from noise, vibration, radiation, temperature, other adverse actions and creating optimal comfort for people and technological process.</p> <p>Definition of forms, sizes of premises and protective structures taking into account the conditions of people's activity, movement of human flows. Placement and operation of equipment, providing the necessary sanitary and hygienic conditions.</p> <p>Methods for assessing the reliability, safety, operating life of the buildings, facilities, and structures used; non-destructive methods of control and diagnostics of their technical condition.</p> <p>Forms of technical operation of buildings, facilities and engineering equipment, improvement of operational qualities of structures, buildings and facilities, prolongation of their operating life, methods of reconstruction, reinforcement, and repair.</p> <p>Development of theoretical bases for obtaining various building materials with a given set of operational properties.</p> <p>Creation of new building materials, which ensure construction of durable buildings and facilities.</p> <p>Development of new energy-saving and environmentally safe technological processes and equipment for obtaining building materials and products of various purposes.</p> <p>Development of methods for forecasting and assessing the stability of building materials and products under specified conditions of operation.</p> <p>Development of methods for increasing in permanence of building products and structures under harsh conditions of operation.</p> <p>Creation of theoretical bases for obtaining building composites of</p>
--	---

	<p>hydration hardening and composite binders and concrete.</p> <p>Development of warehouses and principles for the production of efficient building materials using local raw materials and industrial waste.</p> <p>Development of the system of control and evaluation of the quality of building materials and products.</p> <p>Development of methods of computer design and technology management for obtaining various building materials.</p> <p>Research of joint work of building materials with different properties in layered and complex building constructions.</p> <p>Development of materials and technologies for reconstruction and restructuring of buildings and structures.</p> <p>Development of methods of utilization and reuse of materials from disassembly of buildings and structures.</p> <p>Creation of materials for special constructions and facilities taking into account their specific properties.</p> <p>Development of materials and technologies for the construction of buildings and facilities in winter.</p> <p>Development of the technology of obtaining prefabricated building products and reconstruction of available technological lines and productions.</p> <p>Development of theoretical foundations and technology for obtaining dry mixes of various purposes.</p> <p>Development of methods and equipment for the study of soil parameters of different regions, calculation of strength, stability and deformability of the base. Study of processes and objective laws of filtration, compaction, soil resistance, distortion, rheological processes.</p> <p>Development of methods to calculate the stability of earth structures, pits and trenches. Investigation of the strain-stress state of the elements of the “foundation-base” system at static and dynamic loads, taking into account non-linear processes of material deformation.</p> <p>Development of methods for calculation of foundations in seismic and landslide zones, in tampered and flooded territories.</p> <p>Research of foundations structures on forest, karst territories, on artificial weak bases.</p> <p>Experimental and numerical studies of the interaction of foundations with bases taking into account the rigidity of underground structures, including reconstruction issues.</p> <p>Optimization, improvement, and reliability increase of heat and gas supply, ventilation and air conditioning systems, methods of their calculation and design.</p> <p>Creation of microclimate systems in premises, vented emissions cleaning, their reduction and dispersion at combustion of fuel in boiler houses.</p> <p>Energy saving by utilizing and using alternative heat sources, heat treatment of various technological waste.</p> <p>Constructional heat engineering, including heat and mass transfer and hydro aerodynamics of HGV systems, heat-cold generating, boiler devices, research of heat, air, humidity in the premises, buildings and constructions.</p>
--	--

	<p>Building acoustics and illumination engineering in premises, buildings of various purposes. Development of methods of calculation and design of thermal characteristics of buildings and safety barriers, sound absorbing and light-transmitting walls, standardization of conditions that provide acoustic, light and temperature comfort in the premises.</p> <p>Scientific substantiation of construction and operation of backwater, water intake, and drainage facilities. Hydrological and hydrogeological objective laws, which ensure water supply and drainage.</p> <p>Mathematical maintenance of norms, modes of water consumption and drainage; intensification and modification of the work of facilities and equipment for receiving water from surface and underground sources, its transportation; hydraulic objective laws of water supply and sewage systems, water supply and drainage systems.</p> <p>Development of measures to intensify the work of structures, apparatus, mechanisms; means of control and management for treatment and disposal of sediment and sludge that may be found in water supply and sewage facilities.</p> <p>Basics of rational use of closed systems of water supply of industrial enterprises and complexes, reversible cycles of their water supply. Devices and equipment used in reversible systems.</p> <p>Technical and economic efficiency, reliability of water supply systems, mathematical support for optimization of design solutions, construction and reconstruction of water supply systems, specifics of construction and installation and adjustment works.</p> <p>Basics of operation of water supply systems, optimization of their operation modes. Improvement of fittings, pipes, equipment of water supply systems.</p> <p>Scientific basis for the creation and improvement of technology and the organization of construction and assembly processes related to the construction, reconstruction, restoration, repair of buildings, structures and complexes, in particular under special conditions.</p> <p>Organizational and technological design of the building, models, methods and solutions taking into account the conditions of large scale construction of construction sites.</p> <p>Organizational structures, forms and methods of management of the enterprises of the building complex and its material and technical base.</p> <p>Scientific and methodical foundations of designing of technological processes and organization of construction with the use of modern information support and computer technology.</p> <p>Development of scientific, theoretical foundations of complex mechanization and automation of building processes.</p> <p>Ways to reduce energy intensity, labor intensity, material intensity, and cost of construction products.</p> <p>General principles of calculation of structures and their elements.</p> <p>Linear and nonlinear mechanics of structures and facilities, development of physical and mathematical models of their</p>
--	--

	<p>calculation.</p> <p>Analytical methods of calculation of structures and their elements.</p> <p>Numerical methods of calculating structures and their elements.</p> <p>Theory and methods of optimization of structures.</p> <p>Theory and methods of calculating buildings for reliability.</p> <p>Theory and methods of calculating buildings in extreme situations (earthquakes, hurricanes, explosions, etc.).</p> <p>Investigation of loads on buildings.</p> <p>Experimental methods of investigating structures and their elements.</p> <p>Scientific definition of territorial and urban facilities and systems of urban economy, their functional, planning parameters and evaluation criteria. Development of the foundations of their typology.</p> <p>Theory, methodology, techniques of engineering-planning and space-spatial formation and reconstruction of urban development sites of various types.</p> <p>Engineering, technical, socio-economic, environmental, technological factors influencing the formation of the living environment.</p> <p>Methods of optimization of architectural and engineering-planning decisions of inhabited places and regions taking into account features of socio-demographic, economic, environmental processes, natural conditions on the basis of modern information technologies.</p> <p>Technology of the complex of design and planning works, management of the processes of functioning and development of regions, cities and villages using the methods and means of applied informatics, heuristic methods of creativity in urban design.</p> <p>Methods of multi-factor assessment of the qualities of urban development decisions at different phases and stages of designing.</p> <p>Methods of creating and maintaining an urban development cadaster of settlements, urban development data banks, and other territorial information systems (TIS).</p> <p>Objective laws and tendencies of housing, organization of production activity, functioning of objects of municipal economy, social sphere, urban transport systems, street and road network and their elements, systems of engineering equipment and engineering preparation of territory, improvement, landscape architecture.</p> <p>Urboecology, resource conservation.</p> <p>Economy of urban development, assessment of territory.</p> <p>Objectives of training: training of highly skilled staff in the area of construction and civil engineering, possessing the necessary competencies for professional and / or research and innovation activity, preparation and defense of the thesis.</p> <p>Theoretical subject matter: theoretical foundations of innovative building technologies; theories, concepts, principles, methodologies and methods of solving specialized complex problems in the area of construction and civil engineering.</p> <p>Methods, tools, and technologies: theoretical: analysis,</p>
--	---

	<p>synthesis, comparison, abstraction, generalization, formalization, problem-setting, hypothesis; modeling; empirical: study of literature, documents and results of activity, observation, measurement, survey, expert evaluation, testing, retrospective, survey, monitoring, experiment, forecasting.</p> <p>Instruments and equipment: construction machinery, appliances and equipment, geodetic instruments, climatic equipment, control instruments necessary for the operation of engineering systems, technological equipment for the manufacture of structures and products, technological, informational, instrumental, metrological, diagnostic, and organizational support of construction; equipment, tools and software for field, laboratory and remote studies of building systems.</p>
Orientation of the educational program	Educational and scientific
The main focus of the educational program and majors	Formation of the professional competencies required for innovation, research, and production activities for the development and implementation of modern technologies in the area of construction and civil engineering.
Features of the program	Degree-seekers develop scientific, research, innovative competences, deepen the educational and scientific component of professional activity
4 – Employability and Further Education Eligibility of Graduates	
Employability	<p>Graduates from postgraduate studies in specialization “Construction and civil engineering” may be employed at higher education institutions, research and production institutions. Graduates who have mastered the program of Doctor of Philosophy can carry out professional design and technological, production-technological, organizational and managerial, scientific and research (innovative), educational and methodical activities.</p> <p>Names of professions according to the National Classifier of Ukraine: Classifier of occupations (DK 003: 2010): 2142 Experts in the area of civil engineering 2310 Teachers of universities and higher education institutions</p>
Further Education	After obtaining a PhD degree, a graduate may undertake doctoral studies and obtain a degree of doctor of science.
5 – Teaching and Knowledge Assessment System	
Teaching and training	Problem-oriented learning with the formation of competences, sufficient for the production of new ideas, solving complex problems in the professional area. Mastering the methodology of scientific work, skills of presentation of its results in Ukrainian and foreign languages. Conducting independent scientific research using the resource base of the university and partners. Individual scientific guidance, support and counseling by a research supervisor. Acquiring skills of scientific and pedagogical work at a higher education institution
Knowledge assessment system	Interim control in the form of an annual report according to an individual plan. State attestation in the form of qualification examinations in general and professional training. Approbation of research results at scientific conferences. Publication of research results in professional scientific publications (including at least

	<p>one in a publication included in international scientometrical bases, in particular, Scopus or WOS). Multimedia presentation of the results of the dissertation research at a scientific seminar or broadened session of the department. Public defense of the thesis in the specialized scientific board.</p> <p>The assessment system for each discipline includes the current, modular (according to the defined content module) and the final control of the training results, assessment of the results of the protection of the reports on practice and state attestation.</p>
6 – Program Competencies	
Integrated competence	<p>IC1. Ability to solve complex problems in the area of construction and civil engineering, which involves careful analysis and generalization of available and creation of new integrated knowledge, mastering the methodology of scientific and scientific and pedagogical activities, conducting own scientific research, the results of which are characterized with a scientific novelty, theoretical and practical value.</p>
General competencies (GC)	<p>GC1 Ability to have complete mastery over the foreign languages for the purpose of obtaining scientific information, implementation of scientific communication, international cooperation, defending their own scholar views.</p> <p>GC2 Ability to organize their own research activities, systemic critical thinking skills; scientific worldview and creative thinking.</p> <p>GC3. Ability to own a critical self-esteem; definition and satisfaction of the moral needs of the individual in relation to the development of society and the state of science; ability to communicate, focusing on universal and professional norms of morality; demonstration of a detailed understanding of a significant number of moral practices for perfection of professional relations.</p> <p>GC4. Ability to analyze the state and prospects of the scientific and technical problem, to formulate the purpose and tasks of the research on the basis of search, selection and study of literary and patent sources; to develop a program of research and methods for its implementation, modification of available and development of new methods for controlling the effectiveness of technical equipment, based on the tasks set; conduct theoretical and experimental research with the aim of modernization, intensification or creation of new technologies.</p> <p>GC5. Ability to learn how to use modern information technologies and software.</p> <p>GC6. Ability to master the modern principles of technology in construction and civil engineering and their use in the implementation of innovative solutions.</p> <p>GC7. System thinking skills; scientific worldview and creative thinking; knowledge of the basics of methodology and organization of research work, approaches to systematic and effective research activities (individual and team); the ability to apply information and communication technologies.</p> <p>GC8. Ability to formulate their own theoretical point of view and concept; to formulate goals and tasks in relation to their topic of research; to define and formulate the idea of an object and subject</p>

	<p>of research; to independently determine theoretical approaches, methods and techniques in theoretical work; compare the obtained results with foreign experience and the results of similar studies and evaluate them critically.</p> <p>GC9. Ability to realize modern scientific problems in construction and compare them with available theoretical trends and scientific approaches, to identify the most urgent solutions, to generate ideas that lead to their solution; the ability to be competent in the development of the latest theoretical concepts and trends in the development of research in the construction and civil engineering.</p> <p>GC10. Ability to perceive, accumulate, analyze, and use fundamental and applied knowledge in the field of technical, engineering and natural sciences, including the use of modern information technologies.</p>
Special competences (SC)	<p>SC1. Ability to analyze the design object and subject area, evaluate and compare various theories, concepts and approaches from the scope of scientific research, draw corresponding conclusions, make suggestions and recommendations.</p> <p>SC2. Ability to master educational and methodological and research standards in the subject field, be able to use them in the development, construction, implementation of innovative solutions.</p> <p>SC3. Ability to design systemic hardware and information and communication technologies.</p> <p>SC4. Ability to design means of realization of innovative projects (methodical, informational, algorithmic, technical) for solving professional and scientific tasks in the professional area.</p> <p>SC5. Ability to organize and conduct training sessions in the specialization.</p> <p>SC6. Ability to formulate and set tasks consistently and manage the enterprise, institution, organization and their divisions, to carry out organizational and managerial activity in the construction and civil engineering.</p> <p>SC7. Ability to investigate trends and patterns of industry development and improve theoretical-methodological, scientific-methodical and applied principles of its reliable functioning.</p> <p>SC8. Ability to understand, develop, organize, manage and to use modern educational-research information systems, information and communication technologies.</p> <p>SC9. Ability to conduct experimental research in the area of research, process and receive expert and analytical assessments of their results.</p> <p>SC10. Ability to improve pedagogical skills, professional skills of future scientists and teachers.</p> <p>SC11. Ability to formulate and reasonably represent scientific hypotheses, competitive ideas, professionally present the results of their research and present them as scientific publications, informational and analytical materials, and implement them in projects.</p> <p>SC12. Ability to work in a group upon a large project.</p> <p>SC13. Ability to apply and integrate knowledge and understanding of other engineering disciplines.</p>

	<p>SC14. Ability to investigate and identify the problem and identify restrictions, including those related to environmental protection, sustainable development, health and safety, and risk assessments.</p> <p>SC15. Ability to understand and take into account social, environmental, ethical, economic, and commercial considerations that influence the implementation of technical solutions.</p> <p>SC16. Ability to demonstrate knowledge and understanding of the commercial and economic context.</p> <p>SC17. Ability to demonstrate an understanding of the need to comply with professional and ethical standards of a high level in engineering activities.</p> <p>SC18. Ability to demonstrate knowledge of management techniques that can be used to achieve engineering goals within a commercial and economic context.</p> <p>SC19. Ability to demonstrate understanding of the legal framework related to engineering activities, including personnel, health, safety and risk (including environmental risk).</p> <p>SK20. Ability to demonstrate knowledge of the characteristics of specific materials, equipment, processes, and products.</p> <p>SK21. Ability to demonstrate an understanding of the contexts where engineering knowledge can be applied (e.g. transaction management, technology development, etc.).</p>
7 – Program Training Results	
<p>PTR1. Possessing scientific and methodological knowledge in the area of construction and civil engineering; skills to formulate ideas, concepts for the purpose of using in educational and scientific work.</p> <p>PTR 2. Ability to develop the subject area, have sufficient competence for the choice of methods of scientific research, ensuring its scientific novelty and practical value.</p> <p>PTR3. Mastering knowledge and skills in scientific and professional training in solving specialized tasks in the area of scientific research.</p> <p>PTR 4 Skills to analyze the results of scientific research, own assumptions and other people’s assumptions that are considered proven.</p> <p>PTR 5 Identify the links between modern concepts in the organization of the educational process and scientific knowledge in the area of construction and civil engineering.</p> <p>PTR 6 Comparison, quantitative and qualitative evaluation, correction of expected / received results of scientific researches.</p> <p>PTR 7. Use of motivation and stimulation of internal and external factors in acquiring knowledge in order to improve their own professional skills.</p> <p>PTR 9 Solving problem issues related to educational and scientific activities. Meeting the requirements to the teacher, researcher; constant self-improvement of their professional and scientific level.</p> <p>PTR 9 Compliance with ethical-deontological principles (formation of skills of collegiality, moral principles in the implementation of pedagogical and scientific work), systems of universal values, methodological norms of scientific research.</p> <p>PTR 10. Creation of the concept of own original scientific research, organization of scientific research and experiments in the subject area.</p>	
8 - Resource Support for Program Implementation	
Staff support	<p>Quantitative and qualitative indicators of the level of scientific and professional activity of scientific and pedagogical staff who provide the educational process under the educational program fully comply with the Licensing Conditions for the Educational Activities of Educational Institutions.</p>

Material and technical support	Quantitative indicators of material and technical support fully comply with the Licensing Conditions for the Educational Activities of Educational Institutions.
Information and teaching and methodological support	The scope, content, and quality of information and teaching and methodological support fully comply with the Licensing Conditions for the Educational Activities of Educational Institutions.
9 – Academic mobility	
National credit mobility	The regulations of the University provide for the possibility of national credit mobility. It is allowed to accept credits gained at other educational institutions of Ukraine.
International credit mobility	The regulations of the University provide for the possibility of international credit mobility
Education for foreign higher education degree-seekers	The regulations of the University provide for conditions of enrollment and study of foreign higher education degree-seekers.

2. List of components of the educational and scientific program and their logical consistency

2.1 List of components of the ESP

Code of the discipline	Name of chapters and disciplines (modules)	Workload (ECTS/hours)
1	2	3
ND.00	Compulsory Courses	32/960
ND.01	Foreign language	8/240
ND.02	Methods of scientific research	6/180
ND.03	Professional ethics and communicative culture of individual	4/120
ND.04	Construction and civil engineering	12/360
ND.04.01	Modern state and prospects of development of metal and wooden constructions	1/30
ND.04.02	Modern state and prospects of development of reinforced concrete and masonry structures	1/30
ND.04.03	The theory of reliability of building structures of buildings and facilities	1/30
ND.04.04	Innovative solutions in geotechnics	1/30
ND.04.05	Current state and problems of development of ventilation and heat and gas supply systems	1/30
ND.04.06	Perspective development of water supply and drainage	1/30
ND.04.07	Current state of development of science and practice of production and application of building materials	1/30
ND.04.08	Current state and prospects of development of technology of industrial and civil construction	1/30
ND.04.09	Current state and prospects of development of organization and management of industrial and civil construction	1/30
ND.04.10	Current state and prospects of development of mechanics of strained bodies	1/30
ND.04.11	City planning	1/30
VD.00	Elective Courses	9/270
VD.01	Model engineering in technological processes	3/90
VD.02	Scientific style of language and writing	3/90
VD.03	Pedagogy in high school	3/90
DV.04.00	Disciplines as may be chosen by postgraduate student according to the fields of expertise:	8/240
DV.04.01.00	Building constructions, buildings and facilities:	8/240

Code of the discipline	Name of chapters and disciplines (modules)	Workload (ECTS/hours)
1	2	3
DV.04.01.01	Computer technologies for the design of reinforced concrete and masonry structures	4/120
DV.04.01.02	Concrete structures operating under special conditions	4/120
DV.04.01.03	Contemporary structures of buildings and facilities made of reinforced concrete, masonry, and composite materials	4/120
DV.04.01.04	Methods of calculating seismic resistance of hydrotechnical structures	4/120
DV.04.01.05	Methods of calculating the reliability of ground hydrotechnical structures	4/120
DV.04.01.06	Methods of calculating the reliability of concrete hydrotechnical structures	4/120
DV.04.01.07	Modern constructions made of wood and plastics. Properties, calculations, and design	4/120
DV.04.01.08	Durability and reliability of metal and wooden constructions	4/120
DV.04.01.09	Work and calculation of steel constructions and node connections, taking into account modern global practice	4/120
DV.04.02.00	Bases and foundations:	8/240
DV.04.02.01	Current state and development of mechanics of soil	4/120
DV.04.02.02	Current state and development of geotechnics and foundation engineering	4/120
DV.04.03.00	Ventilation, illumination, and heat supply:	8/240
DV.04.03.01	General scientific questions in the area "Heating, ventilation and air conditioning"	4/120
DV.04.03.02	General scientific questions in the area "Heat supply and sources of heat and gas supply"	4/120
DV.04.03.03	General scientific questions in the area "Gas supply and gas use"	4/120
DV.04.03.04	Special scientific questions in the area "Heating, ventilation and air conditioning"	4/120
DV.04.03.05	Special scientific questions in the area "Heat supply and sources of heat and gas supply"	4/120
DV.04.03.06	Special scientific questions in the area "Gas supply and gas use"	4/120
DV.04.04.00	Water supply, sewerage:	8/240
DV.04.04.01	Methods of improvement of water supply systems	4/120
DV.04.04.02	Methods of improvement of sewerage systems	4/120
DV.04.04.03	Methods of improving systems of industrial	4/120

Code of the discipline	Name of chapters and disciplines (modules)	Workload (ECTS/hours)
1	2	3
	water supply and sewerage	
DV.04.05.00	Building materials and products:	8/240
DV.04.05.01	Protection of building and architectural structures against corrosion and wear	4/120
DV.04.05.02	Technologies of modern concrete	4/120
DV.04.05.03	Materials and products based on man-made raw materials	4/120
DV.04.05.04	Methods of modifying the properties of concrete mixtures and concrete	4/120
DV.04.05.05	Dry building mixtures	4/120
DV.04.05.06	Modern insulating, roofing and finishing materials	4/120
DV.04.06.00	Technology and organization of industrial and civil engineering:	8/240
DV.04.06.01	Scientific bases of improvement of technological decisions in construction	4/120
DV.04.06.02	Modern organizational and technological solutions for the implementation of special construction work	4/120
DV.04.06.03	Development of forms and methods of designing organization and management in construction	4/120
DV.04.06.04	Methodology of organizational and economic research in construction	4/120
DV.04.07.00	Building mechanics:	8/240
DV.04.07.01	Variation methods in the mechanics of strained bodies	4/120
DV.04.07.02	Nonlinear problems in the mechanics of strained bodies	4/120
DV.04.07.03	Optimization in building mechanics	4/120
DV.04.07.04	Nonlinear problems of the stability theory	4/120
DV.04.08.00	Urban development and territorial planning:	8/240
DV.04.08.01	Integrated urban, regional and interregional transport systems	4/120
DV.04.08.02	The theory of transport flow meters	4/120
P.00	Practice:	3/90
P.01	Teaching practice	3/90
Total for educational component:		50/1500
NDR.00	The scientific and research work of the post-graduate student and the preparation of the thesis submitted for Ph.D. degree	172/5160

Code of the discipline	Name of chapters and disciplines (modules)	Workload (ECTS/hours)
1	2	3
DE.00	State exams	3/90
DE.01	State exam in research methods	1/30
DE.02	State exam in foreign language	1/30
DE.03	State exam in special discipline according to the topic of the thesis	1/30
PD.00	Preparation for thesis defence	15/450
Total for research component		190/5700
Total for training of a post-graduate student		240/7200

2.2 Structural and logical scheme of the ESP

In structural and logical scheme of the educational and scientific program in the specialization in 192 “Construction and Civil Engineering”, the following numbers shall indicate:

- the numerator shows the amount of academic credits;
- the denominator shows the amount of academic hours.

Structural and logical scheme of the educational and scientific program

Compulsory Courses of the educational and scientific program			
Compulsory Courses			
ND01. Foreign language	ND02. Methods of scientific research	ND03. Professional ethics and communicative culture of individual	ND04. Construction and civil engineering
8/240	6/180	4/120	12/360
Elective Courses			
VD01. Model engineering in technological processes	VD02. Scientific style of language and writing	VD03. Pedagogy in high school	
3/90	3/90	3/90	
Selected Courses of the Educational and Scientific Program			
Disciplines as may be chosen by postgraduate student according to the fields of expertise:			
DV04.01.00 Building constructions, buildings and facilities	DV04.02.00 Bases and foundations	DV04.03.00 Ventilation, illumination, and heat supply	DV04.04.00 Water supply, sewerage
8/240	8/240	8/240	8/240
DV04.05.00 Building materials and products	DV04.06.00 Technology and organization of industrial and civil engineering	DV04.07.00 Building mechanics	DV04.08.00 Urban development and territorial planning
8/240	8/240	8/240	8/240
Teaching practice			
3/90			
State exam in research methods	State exam in foreign language		State exam in special discipline according to the topic of the thesis
The scientific and research work of the post-graduate student and the preparation of the thesis submitted for Ph.D. degree			
172/5160			

3. Assessment of Higher Education Degree-Seekers

Final certification of the degree-seeker includes the individual plan implementation, passing state examinations, and submission of thesis to the department to obtain a corresponding conclusion. The procedure for conducting state examinations is established by the Regulation on the procedure for the training of experts holding Ph.D. degrees and Doctors of Sciences at postgraduate courses and doctoral courses of higher educational institutions (scientific institutions) in the system of vocational education of Ukraine. The state examination on the scientific specialty includes additional sections, according to the specifics of the scientific specialization (additional program).

The certification of Ph.D. degree-seekers is carried out by a permanent or one-time specialized academic board of higher educational institution on the basis of public defense of scientific achievements in the form of a thesis. Degree-seekers have the right to choose a specialized academic board. Requirements for the content and formalization of the thesis are determined by the Attestation Board of the Ministry of Education and Science of Ukraine. Requirements for the final state attestation (the procedure for submission and defense of the thesis for Ph.D. degree) are developed by the Attestation Board of the Ministry of Education and Science of Ukraine. Qualifying work of the degree-seekers is subject to

5. Support Matrix of Training Results under the Program by the Relevant Components of the Educational Program

	ND.01	ND.02	ND.03	ND.04	VD.01	VD.02	VD.03	DV.04.01	DV.04.02	DV.04.03	DV.04.04	DV.04.05	DV.04.06	DV.04.07	DV.04.08	P01
PTR1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PTR2		+	+		+											
PTR3	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PTR4		+	+		+											
PTR5					+	+	+									+
PTR6	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PTR7					+											
PTR8		+	+		+	+	+									+
PTR9		+	+		+											
PTR10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

6. The System of Internal Quality Assurance of Higher Education at KhNUBA

6.1 Principles and procedures of education quality assurance

These ones are defined in the Law of Ukraine “On Higher Education” dated 01.07.2014 No. 1556-VII, “Standards and Guidelines for Quality Assurance in the European Higher Education Area” of the European Association for Quality Assurance in Higher Education.

Principles of education quality assurance:

- compliance with European and national standards of higher education quality;
- autonomy of a higher educational institution, which is responsible for ensuring the quality of educational activities and the quality of higher education;
- quality monitoring;
- systematic approach involving quality management at all stages of the educational process;
- involving students, employers, and other interested parties in the process of quality assurance in higher education;
- transparency of information at all stages of quality assurance.

Higher education quality assurance procedures:

- enhancing the planning of educational activities: monitoring and periodic updating of educational programs;
- qualitative selection of higher education degree-seekers;
- increase in the share of instructors with scientific degrees and academic (honorary) titles;
- improvement of material and technical and teaching and methodological support for the implementation of the educational process;
- provision of the necessary resources to support higher education master-degree seekers;
- development of information systems in order to improve the management of the educational process;
- ensuring transparency about the university’s activities;
- creation of an effective system for preventing and detecting academic plagiarism in scientific works;
- creation of an effective system for preventing corruption and bribery in the educational process of the university.

6.2 Monitoring and periodic review of the educational program

The educational process shall be implemented in accordance with the development of the educational program.

The monitoring and periodic review of the educational program shall be carried out in accordance with the requirements of the relevant regulation.

The criteria for reviewing the educational program shall be formulated as a result of feedback from scientific and pedagogical staff, students, graduates, employers, and as a result of forecasting the development of the industry, the needs of society, and the labor market needs.

Indicators of the modern educational program shall be:

- updating;
- participation of employers in the development and implementation of amendments to the educational program;
- satisfaction of postgraduate students (graduates) with the content of the educational program;
- feedback from employers on the level of postgraduate students' training.

6.3 Annual assessment of higher education degree-seekers

Assessment of post-graduate students' knowledge and practical skills shall be carried out at the university in accordance with the Regulation "On Assessment of Knowledge and Skills of Students of the Kharkiv National University of Construction and Architecture under the European Credit Transfer and Accumulation System".

The system for assessing the quality of post-graduate students training shall include: initial, current, semester, final control, and assessment of higher education degree-seekers.

6.4. Advanced training of scientific and pedagogical, pedagogical and scientific staff

Scientific and pedagogical staff of the university shall regularly improve their qualification in Ukraine and abroad by defending theses, receiving the certificate of the assistant professor (professor), as well as undertaking internship or taking advanced training courses receiving the corresponding supporting document at least once in 5 years.

The university shall ensure various forms of advanced training of scientific and pedagogical staff at least once in 5 years in accordance with the schedule, which is approved by the Academic Board of the University and rendered effective under the order of the rector.

6.5 Availability of the necessary resources for the organization of the educational process

The resources for the organization of educational process at the university shall include:

- working curriculum;
- work programs of academic disciplines and practices.

In accordance with the current licensing terms:

- proper teaching and methodological support of educational disciplines;
- modern information sources and computer equipment;
- webpage of the university;
- Internet access;
- library supplied with the latest educational literature, scientific, reference, and professional periodicals;
- technical teaching aids;
- availability of practical bases to ensure all types of practices;
- proper staffing for teaching disciplines.

6.6 Availability of information systems for effective management of the educational process

Electronic system of information gathering and analysis (EDEBO). Electronic document flow system. Email box.

6.7 Publicity of information about educational programs, degrees of higher education and qualifications

Availability of the official website of the university.

The official website of the university shall publish: its statute, its regulations, rules of admission, higher education degrees the specialists are trained for, data on educational and educational and scientific programs, etc.

6.8 Preventing and detecting academic plagiarism

Procedures and measures:

- formation of a university staff members that do not accept and do not tolerate academic dishonesty;
- creating conditions for intolerance to academic plagiarism cases;
- implementation of Antiplagiat software environment;
- detection and prosecution of the academic integrity offenders.

7. Final provisions

The educational program shall be published on the official website of the university prior to the admission of prospective post-graduate students to the post-graduate courses in accordance with the applicable “Rules of Admission”.

The guarantor of the educational program in the special field shall be responsible for implementing the educational program and ensuring the quality of higher education.

Guarantor of the educational program,
Professor, Head of the Department of
Construction Technology, Doctor of
Technical Sciences, Associate Professor

/signed/

Shumakov I.V.