

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

ODESA STATE ACADEMY OF CIVIL ENGINEERING AND  
ARCHITECTURE



A. Ковров

2024

## EDUCATIONAL AND PROFESSIONAL PROGRAM

**Industrial and civil engineering**  
**second (master's) degree of higher education**  
**specialty 192 Construction and civil engineering**  
**Fields of knowledge 19 Civil engineering and architecture**  
**Qualification: Master's degree in civil and structural engineering**

**APPROVED**

By the Academic Council of the Odesa  
State Academy of Civil Engineering and  
Architecture

Protocol № 8 of "25" 04 2024

## INTRODUCTION

### 1. DEVELOPED

The educational and professional program Industrial and Civil Engineering was developed by a working group of the Odesa State Academy of Civil Engineering and Architecture:

Olexandr Gilodo	PhD, Head of the Department of Metal, Wooden and Plastic Structures, Chairman of the Scientific and Methodological Commission of the Institute of Civil Engineering, guarantor of the educational program
Olexandr Meneyliuk	Doctor of Technical Sciences, Professor, Head of the Department of Construction Production Technology
Irina Kornceva	PhD, Associate Professor of the Department of Materials Resistance
Lilia Klyamar	PE Vambud, Head of the Construction Department, Employer Stakeholder
Igor Astin	FARENHOLZ ENGINEERING, 1 category designer, Employer Stakeholder
Konstantin Vasilyuk	applicant for the educational and professional program Industrial and Civil Engineering of the second (master's) degree of higher education

### 2. APPROVED AND ENTERED INTO FORCE

By the Academic Council of the Odesa State Academy of Civil Engineering and Architecture, Minutes No. 8 of April 25, 2024

### 3. ENTERED into force on September 01, 2024

to replace the Educational and Professional Program Industrial and Civil Engineering, specialty 192 Construction and Civil Engineering of the second (master's) level of higher education, approved by the Academic Council of the Odesa State Academy of Civil Engineering and Architecture on May 04, 2023, Minutes No. 8.

### 4. INFORMATION ON ACCREDITATION

Accredited until January 28, 2025. <https://registry.naqg.gov.ua/#/op/6284>

Accreditation of the educational program is scheduled for the academic year 2024-2025.

#### 1. Profile of the educational and professional program Industrial and civil engineering specialty 192 Construction and civil engineering

1 - General information	
Full name of the higher education institution and structural unit	Odesa State Academy of Civil Engineering and Architecture, Civil Engineering Institute, Graduate departments: - architectural structures; - construction mechanics; - Reinforced concrete structures and transport facilities; - metal, wooden and plastic structures; - bases and foundations; - organization of construction and labor protection; - technology of construction production.
Level of higher education	Second (master's) degree

Degree of higher education and title of qualification in the original language	Master's degree in civil and structural engineering
Official name of the educational program	Educational and professional program Industrial and civil engineering
Type of diploma and scope of the educational program	Type of diploma - single. Volume of the educational program - 90 ECTS credits
Availability of accreditation	Accreditation certificate No. 190 dated 28.01.2020. Valid until 28.01.2025
Cycle / level	HSC of Ukraine - level 7, FQ-EHEA - second cycle, EQF LLL - level 7
Background	Possession of a bachelor's degree, master's degree, specialist's degree, according to the rules of admission for the current year
Language of teaching	Ukrainian, English
The validity period of the of the educational program	Until the next edition comes into force
Internet address for permanent placement of the description of the educational program	<a href="https://odaba.edu.ua/education/educ-programs">https://odaba.edu.ua/education/educ-programs</a>

## **2 - The purpose of the educational program**

Masters in Industrial and Civil Engineering acquire theoretical and practical skills in the design, construction, operation, storage and reconstruction of construction facilities and engineering structures, analysis of construction efficiency and reliability, optimization of construction projects and design and technological solutions; application of modern energy-efficient technologies; improvement of environmental safety.

## **3 - Educational program characteristics**

Subject area (field of knowledge, specialty, specialization)	Field of knowledge 19 Architecture and construction Specialty 192 Civil and structural engineering
Orientation of the of the educational program	Professional. Acquisition of theoretical and practical knowledge for the design, construction, operation, storage and reconstruction of building facilities and structures. Mastering of methods, techniques and technologies in the field of innovative and energy-saving technologies for the

	calculation and creation of efficient structures, for construction and installation works and reconstruction of construction facilities.
Main focus of the educational program	Higher education in the field of 19 Architecture and Construction, specialty 192 Construction and Civil Engineering, the broader professional development program Industrial and Civil Engineering. Keywords: construction industry, industrial and civil engineering, innovations, structural design, design, organizational and technological solutions, information technology in construction.
Program features	The program takes into account current trends in the development of the construction industry, in particular in the South of Ukraine, and covers disciplines that combine theoretical knowledge with practical skills and abilities for future professional activities. Participation of applicants in design, innovation and technological developments ensures the acquisition of professional skills based on the acquired competencies. Applicants undergo practical training at leading construction companies, including branches of graduating departments. Emphasis is placed on the theoretical and practical content of program competencies, such as the principles of calculation and design of building structures, innovative technologies and organizational solutions, in particular, taking into account regional features: historical architectural heritage, seismic activity of the area, coastal landslide zone, and complex engineering and geological conditions. The content of the educational components takes into account the requirements for construction workers during the war and includes the following relevant topics: Strengthening of stone structures in the reconstruction and restoration of architectural and urban monuments, Peculiarities of designing buildings and structures with regard to seismic impacts in the Odesa region, Design of shelters, Explosive loads and their effects on the structures of buildings and structures, Operational management of the reconstruction of civilian facilities in case of large-scale destruction due to explosions.
<b>4 - Suitability of graduates for employment and further education</b>	
Employment suitability	Master's degree in Civil and Environmental Engineering under the educational and professional program Industrial and Civil Engineering can hold jobs in the public and private sectors in various fields of activity, in particular: in design and research, design and design institutions, as well as in

	<p>operational, environmental, specialized construction, construction and installation, commissioning institutions, educational institutions.</p> <p>According to the Classification of Economic Activities DK 009: 2010:</p> <p>F - Construction</p> <p>Master of Civil Engineering and Construction is able to perform professional work and hold positions in accordance with the National Classification of Occupations of Ukraine “Classifier of Occupations” DK 003: 2010 (as amended):</p> <p>2142 Professionals in the field of civil engineering:</p> <p>2142.2 Engineers in the field of civil engineering:</p> <ul style="list-style-type: none"> <li>- Engineer for technical supervision (construction)</li> <li>- Engineer for design and estimate work</li> <li>- Civil engineer</li> <li>- Design engineer (civil engineering)</li> </ul> <p>3151 - Inspector for control over the technical maintenance of the building.</p> <p>3152 Inspectors of labor protection and quality (inspector of operational, production, technical and organizational issues)</p> <p>M 71. Activities in the fields of architecture and engineering; technical testing and research:</p> <p>71.12 Engineering, geology and geodesy activities, and provision of technical consulting services in these fields</p> <p>71.20 Technical testing and research</p> <p>72.19 Research and experimental development in other natural and technical sciences</p> <p>74.90 Other professional, scientific and technical activities</p> <ul style="list-style-type: none"> <li>- Construction (code F):</li> </ul> <p>K 74.50 Recruitment and staffing</p> <p>Occupations and professional titles according to the International Standard Classification of Occupations 2008 (ISCO-2008)</p> <p>2142 - Civil engineers</p> <p>3112 - Civil engineers technicians</p> <p>3118 - Draughtspersons</p> <p>3119 - Physical and engineering science technicians</p>
Further education	<p>The Master of Civil and Environmental Engineering has the right to study educational programs of the third (PhD) cycle of the FQ-EHEA, level 8 of the EQF-LLL and level 8 of the NQF in the specialty 192 Civil and Environmental Engineering, interdisciplinary programs, and to acquire additional qualifications in the postgraduate education system.</p>
<b>5 - Teaching and assessment</b>	

Teaching and learning	<p>The approaches used in teaching include the methods and technologies of modern learning provided by the educational program, namely: student-centered learning, self-study, problem-based learning, independent work of students, including individual tasks: course projects, term papers, calculation and graphic works, tests; professional practice. The main teaching methods are explanatory and illustrative, problem-based, research, and visualization.</p> <p>Teaching methods are implemented in the educational process in accordance with the level of higher education, specialty and goals of the educational program, taking into account <a href="#">the Mission and goals of</a> educational activities and the Development <a href="#">Strategy of</a> the Odesa State Academy of Civil Engineering and Architecture.</p> <p>The formation of social skills (soft skills) of applicants occurs through the study of both general and professional components; participation in conferences with reports; competitions, competitions of student research papers, practical training, <a href="#">academic mobility</a>, cultural and sports activities; other activities that are determined by the goals of the program, in particular the further professional activities of the program graduate.</p> <p>The overall organization of <a href="#">international cooperation and foreign economic activity</a> is entrusted to the <a href="#">Department of International Relations</a>.</p> <p>Higher education students enrolled in the educational and professional program are provided with</p> <ul style="list-style-type: none"> <li>- educational support in the context of issues directly related to the organization of learning and teaching, including the work of deans' offices, departments for the organization of the educational process, other auxiliary units of the Academy and their interaction with applicants</li> <li>- advisory and social support in the relevant areas (employment counseling, psychological support, etc.)</li> <li>- organizational and informational support in the relationship between applicants and the Academy on administrative issues (obtaining information, certificates, confirmations, etc.);</li> <li>- information interaction of higher education applicants on educational and extracurricular issues, including the availability of relevant information in the public domain (schedule, consultations, other information on the <a href="#">official website of the Academy</a>).</li> </ul> <p>Teaching is conducted in the form of: lectures, lectures-presentations using information and communication</p>
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	<p>technologies, practical classes, practical workshops (including with the involvement of practicing artists, specialists in other creative specialties), practical training, independent study based on modern scientific and methodological literature and consultations of teachers.</p> <p>There are also opportunities for learning and teaching using distance learning technologies (including Google Workspace, Moodle).</p>
Оцінювання	<p>The system for assessing the quality of the educational and professional program includes: current and final (semester) control, certification.</p> <p>Current control is carried out in practical classes (oral or written questioning, express control, speeches of applicants during the discussion of issues, control works, test control, presentations, etc.)</p> <p>The final control is carried out in the form of an exam or test, defense of course projects (works), defense of practice reports.</p> <p>The certification of higher education students is carried out in the form of a public defense of qualification work.</p> <p>The academic achievements of higher education students are assessed on a 100-point scale and the ECTS scale.</p>
<b>6 – Program competencies</b>	
Integral competence (IC)	<p>Ability to solve complex problems and solve practical problems in the field of industrial and civil engineering, based on the application of basic theories and innovative methods with an in-depth level of knowledge of basic and applied sciences.</p>
General competencies (GC)	<p>GC1. Ability to solve fundamental problems related to the functioning of the creative personality, various forms of creative activity.</p> <p>GC2. Ability to collect and analyze scientific and technical information in the field of intellectual property, solve problems related to the protection of intellectual property rights.</p> <p>GC3. Ability to analyze facts, phenomena and processes taking into account modern trends in the development of civilization, to identify existing technical contradictions, to apply methods and techniques of technical creativity to find new principles.</p> <p>GC4. Ability to provide measures and means of protection of personnel and the public in emergency situations.</p> <p>GC5. Ability to generate new ideas and projects, and their implementation on the basis of acquired and natural leadership skills, intelligence, professional experience.</p>

	<p>GC6. Ability to communicate professionally, scientifically and situationally in oral and written forms.</p> <p>GC7. Ability to design organizational and technical measures and optimize workplaces.</p> <p>GC8. Ability to apply knowledge of industry economics and pricing in practical situations.</p> <p>GC9. Ability to accurately formulate thoughts orally and in writing in a native and foreign language with the ability to work in an international context in the field of construction.</p>
Special (professional) competencies	<p>PC1. Knowledge of modern building materials, technological processes and methods of organizing modern industrial and civil engineering.</p> <p>PC2. Knowledge of the basic principles of fracture mechanics; methods for determining the intensity of stresses for concrete, reinforced concrete, metal structures; physical and mechanical principles of durability based on regulations and reference materials, current standards and specifications, instructions and other regulatory documents in professional activities.</p> <p>PC3. Ability to apply the principles of energy conservation in professional activities.</p> <p>PC4. Ability to assess the danger of aggressive influences on building structures and structures - atmospheric, chemically and biologically active environments, leakage currents and stray currents, etc., to develop and implement measures to protect against them and ensure the required durability of structures and structures.</p> <p>PC5. Ability to make a conclusion about the technical condition of a building or structure and its further operational suitability or the need to restore this suitability.</p> <p>PC6. Ability to design buildings and structures, including using computer-aided design software systems, based on an effective combination of innovative technologies for their implementation.</p> <p>combination of innovative technologies for their implementation, multivariate calculations of concrete and reinforced concrete, metal structures.</p> <p>PC7. Ability to understand and take into account social, environmental, ethical, economic and commercial considerations that affect the implementation of construction solutions.</p> <p>PC8. Ability to carry out feasibility studies of architectural, structural, organizational and technological solutions for the design and construction, reconstruction or repair of buildings</p>



	<p>and structures, to develop technical documentation for projects and their elements.</p> <p>PC9. Ability to find optimal solutions in the creation of certain types of construction products, taking into account architectural, planning, organizational and technological requirements, strength, durability, life safety, quality, cost, timing and competitiveness.</p> <p>PC10. Ability to apply new ideas (creativity) and a systematic approach to solving engineering problems based on research within the specialty.</p> <p>PC11. Ability to substantiate and make optimal decisions on the arrangement of bases and foundations in special conditions.</p> <p>PC12. Ability to use modern computer programs, systems and technologies in engineering and research activities, in solving problems, including construction in special conditions and taking into account seismic resistance.</p> <p>PC13. Ability to formulate and solve problems of optimizing the parameters of mechanical systems by analytical and numerical methods.</p> <p>PC14. Ability to ensure the legitimacy of economic activity in the field of construction and civil engineering.</p>
<b>7 - Program learning outcomes (PLOs)</b>	
<p>Program learning outcomes (PLOs)</p>	<p>PLO1. Ability to assess the overall performance of the construction company.</p> <p>PLO2. Ability to use the provisions of regulations in professional activities; to draw up basic business contracts; to navigate the process of licensing certain types of activities.</p> <p>PLO3. Ability to use regulations in everyday and professional activities; to navigate scientific, specialized literature and laws.</p> <p>PLO4. Ability to practically implement measures to protect personnel and the public from the consequences of accidents, disasters, natural disasters and the use of weapons; assess the sustainability of elements of economic activity in emergency situations and determine the necessary measures to improve it; assess the radiation, chemical, bacteriological situation and the situation that may arise as a result of a natural disaster and accident.</p> <p>PLO5. Ability to apply numerical methods; calculate and analyze (evaluate) mathematical models.</p> <p>PLO6. Ability to apply systems for organizing and performing preparatory work at the workplace; to compile a list of measures related to the regulatory state of the safety</p>

	<p>system and possible deviations in the emergency direction of the production situation; to have the skills of optimal management of several workplaces on safety issues.</p> <p>PLO7. Ability to assess the risk of aggressive influences on building structures and structures - atmospheric, chemically and biologically active environments, leakage currents and stray currents, etc., to develop and implement measures to protect against them and ensure the required durability of structures and structures.</p> <p>ELO8. To use technical Ukrainian language orally and in writing.</p> <p>PLO9. Ability to design structures from modern materials; assess the operation and stress state of buildings and structures as a whole, their structural elements, redistribution of forces due to changes in the design scheme; solve the problem of assessing the bearing capacity of structures.</p> <p>PLO10. Ability to independently solve the problem of choosing the best energy sources, including non-traditional ones, and in the conditions of production activity - to independently solve the problem of choosing the most efficient heat, water, energy supply systems.</p> <p>PLO11. Ability to design modern engineering networks; solve issues of evaluation and equipment to ensure their operational suitability, using modern technologies for the construction and repair of these systems.</p> <p>PLO12. Ability to inspect the technical condition of buildings, structures and utilities, and assess this condition; assess their further operational suitability or the need to develop a project to restore this suitability; calculate the level of required increase in the bearing capacity of the structure to ensure the operational suitability of the building.</p> <p>PLO13. Ability to design buildings and structures, including using computer-aided design software systems based on an effective combination of innovative technologies and performing multivariate calculations of metal structures.</p> <p>PLO14. To design structures of buildings and structures to ensure their strength, stability, durability and safety, to ensure reliability.</p> <p>PLO15. Perform feasibility studies of structural, technological, organizational solutions for the construction or reconstruction of buildings and structures, develop technical documentation for projects and their elements.</p> <p>PLO16. Ability to take into account social, environmental, ethical, economic and commercial considerations that affect the implementation of construction solutions.</p>
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	<p>PLO17. Ability to find optimal solutions in the creation of certain types of construction products, taking into account architectural and planning requirements, strength, durability, life safety, quality, cost, timing and competitiveness.</p> <p>PLO18. Ability to justify and make optimal decisions on the arrangement of bases and foundations in special conditions.</p> <p>PLO19. Ability to apply knowledge in design and research work on the use of modern information technologies in solving problems of earthquake resistance.</p> <p>PLO20. Ability to study the construction object in accordance with the chosen topic of the master's thesis; to collect and analyze the necessary material (source information) for the master's thesis; apply the knowledge and skills acquired throughout the course of study.</p> <p>PLO21. Implement effective methods of managing complex construction projects with awareness of responsibility for decisions and ensuring the quality of work.</p>
<b>8 - Resource support for program implementation</b>	
Staffing support	<p>Academic staff involved in the implementation of the educational and professional program work at the main place of work at the Academy, have an academic title and/or degree, meet the requirements of licensing and accreditation conditions for the implementation of educational activities in the field of higher education (Resolution of the Cabinet of Ministers of Ukraine “On Ensuring Licensing Conditions for the Implementation of Educational Activities of Educational Institutions” of December 30, 2015, No. 1187, as amended). In order to maintain competence at the proper level, all academic staff undergo advanced training/internships.</p>
Material and technical support	<p>The material and technical support of the Odesa State Academy of Civil Engineering and Architecture complies with the Licensing Conditions for Educational Activities in Higher Education and is sufficient to ensure the quality of the educational process under the educational and professional program, which includes: workshops, classrooms, computer and specialized classrooms, library, reading rooms, gyms, assembly hall, sports ground, recreation center, canteens, and simple shelters.</p>

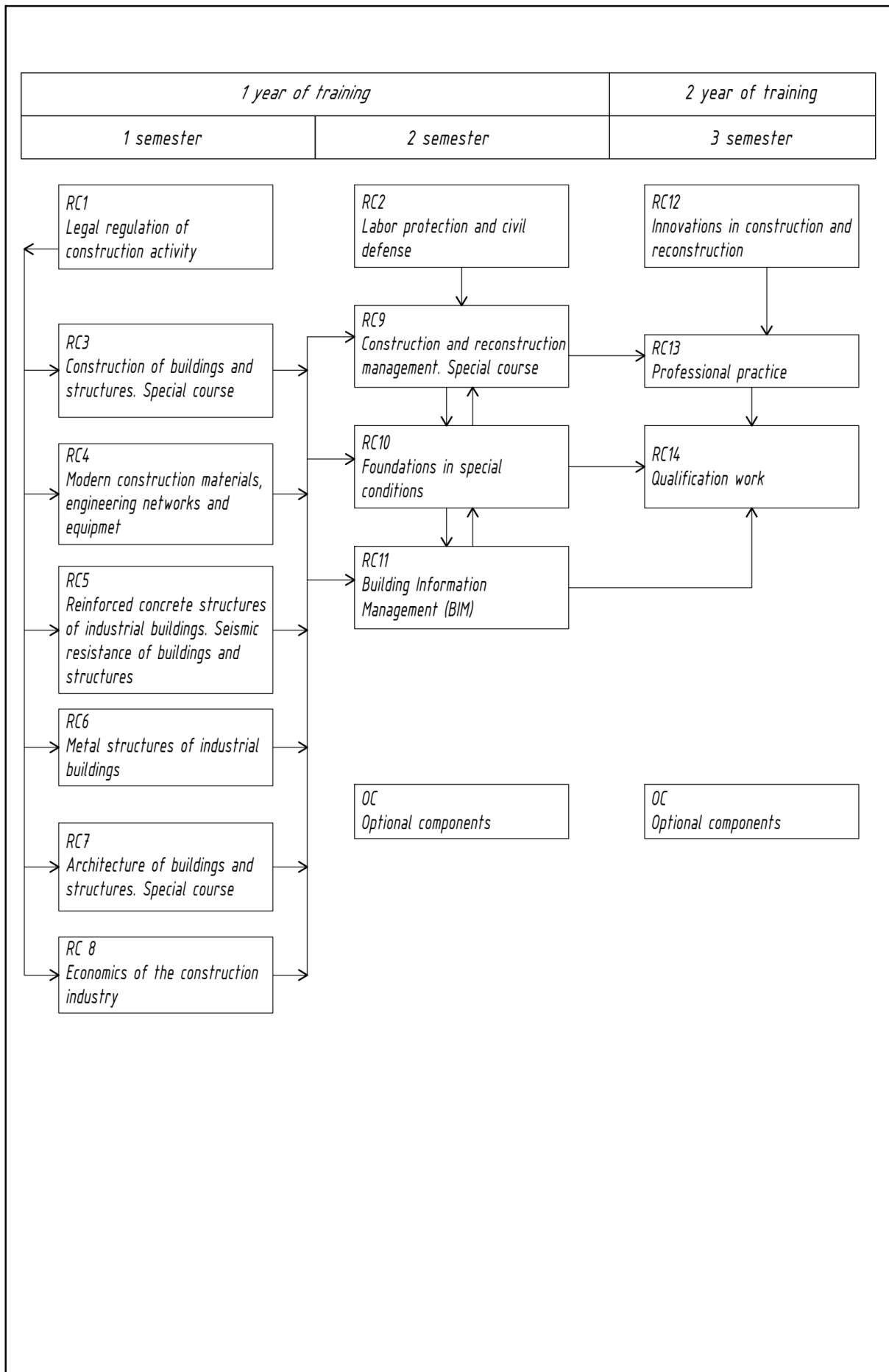
Information and educational support	Use of electronic resources: electronic catalog, electronic library, Internet resources, Open Access, the Academy's website, bibliographic resources, the Academy's repository (OSACEAeR <a href="http://mx.ogasa.org.ua/">http://mx.ogasa.org.ua/</a> ), Google Workspace and author's educational and methodological developments of scientific and pedagogical staff. There is a licensed version of the database of normative literature BudInfo.
<b>9 - Academic mobility</b>	
National credit mobility	It is carried out on the basis of bilateral agreements between the Academy and higher education institutions of Ukraine and existing national programs. It provides for the transfer of ECTS credits of the relevant educational program received in other higher education institutions of Ukraine.
International credit mobility	International academic mobility is realized on the basis of international cooperation agreements, international programs and projects, and cooperation agreements with foreign higher education institutions. The main international credit mobility is carried out under the ERASMUS+ and MEVLANA programs.
Training of foreign students of higher education	The training of foreign applicants in the educational and professional program Industrial and Civil Engineering is carried out on the basis of the Order of the Ministry of Education and Science of Ukraine dated 18.07.2019 No. 944-1 and in accordance with the Rules of Admission to the Odesa State Academy of Civil Engineering and Architecture and the relevant Regulations of the Center for Training of Specialists from Foreign Countries. Languages of instruction - Ukrainian, English

## 2. List of educational components of the educational and professional program Industrial and Civil Engineering and their logical sequence

### 2.1 List of educational components

Code	Components of the educational and professional program (academic disciplines, course projects (works), internships, qualification work)	Number of ECTS credits	Form of final control
1	2	3	4
<b>REQUIRED COMPONENTS</b>			
<b>General components</b>			
RC1	Legal regulation of construction activity	3,0	credit
RC2	Labor protection and civil defense	3,0	credit
<b>Special (professional) components</b>			
RC3	Construction of buildings and structures. Special course.	6,0	credit
RC4	Modern construction materials, engineering networks and equipment	6,0	credit
RC5	Reinforced concrete structures of industrial buildings. Seismic resistance of buildings and structures	4,0	exam
RC6	Metal structures of industrial buildings	4,0	exam
RC7	Architecture of buildings and structures. Special course	4,0	exam
RC8	Economics of the construction industry	3,0	exam
RC9	Construction and reconstruction management. Special course	3,0	credit
RC10	Foundations in special conditions	3,0	exam
RC11	Building Information Management (BIM)	3,0	credit
RC12	Innovations in construction and reconstruction	4,0	exam
RC13	Professional practice	6,0	credit
RC14	Qualification work	12,0	public defense
<b>Total amount of required components</b>		<b>64,0</b>	
<b>OPTIONAL COMPONENTS</b>			
<b>General component</b>			
OC1- OC2	Optional courses	6,0	credit
<b>Special (professional) component</b>			
OC3- OC7	Optional courses	20,0	credit
<b>Total amount of optional component</b>		<b>26,0</b>	
<b>TOTAL EPP VOLUME</b>		<b>90,0</b>	

## 2.2 Structural and logical diagram of the educational and professional program Industrial and civil engineering



### **3. Form of certification of higher education applicants**

Certification of graduates of the educational and professional program Industrial and Civil Engineering, specialty 192 Construction and Civil Engineering is carried out in the form of a public defense of qualification work before the certification examination commission on the selected and approved topics and ends with the provision of a document of the established form on awarding a master's degree with the qualification: Master of Civil Engineering and Construction in the educational and professional program Industrial and Civil Engineering.

Qualification work is performed by the applicant independently under the guidance of a teacher, and should be related to the solution of specific applied problems based on theoretical knowledge and practical experience gained by the student throughout the entire period of study. The applicant chooses one of the topics offered by the department on a relevant topic.

Qualification work is performed in compliance with the principles of the Code of Academic Integrity at the Odesa State Academy of Civil Engineering and Architecture.

The qualification work must be posted on the website of the Academy or the graduating department, or in the repository of the Odesa State Academy of Civil Engineering and Architecture.





**5. Matrix of providing program learning outcomes (PLOs) with relevant components of the educational and professional program Industrial and Civil Engineering**

	OC1	OC2	OC3	OC4	OC5	OC6	OC7	OC8	OC9	OC10	OC11	OC12	OC13	OC14
CWL1								+	+			+	+	+
CWL2	+							+	+				+	+
CWL 3	+	+	+	+	+	+	+	+	+	+	+	+	+	+
CWL 4		+			+	+				+				+
CWL 5											+		+	+
CWL 6		+							+				+	+
CWL 7		+	+	+	+	+				+				+
CWL 8	+	+	+	+	+	+	+	+	+	+	+	+	+	+
CWL 9			+	+	+	+	+			+			+	+
CWL 10				+										+
CWL 11				+										+
CWL 12			+	+	+	+				+			+	+
CWL 13			+		+	+				+	+	+	+	+
CWL 14			+	+	+	+	+			+	+		+	+
CWL 15					+	+	+		+	+	+	+	+	+
CWL 16	+						+	+					+	+
CWL 17		+	+	+	+	+	+	+	+	+	+	+	+	+
CWL 18										+			+	+
CWL 19					+								+	+
CWL 20													+	+
CWL 21	+							+	+					+

**List of normative documents on which the educational and professional program  
Industrial and Civil Engineering is based**

1. Law of Ukraine On Higher Education № 1556-VII від 01.07.2014 р.  
URL: <http://zakon5.rada.gov.ua/laws/show/2145-19>.
2. Law of Ukraine On Education № 2145-УІІ від 05.09.2017 р.  
URL: <http://zakon5.rada.gov.ua/laws/show/2145-19>.
3. Licensing conditions for conducting educational activities. Resolution of the Cabinet of Ministers of Ukraine 30.12.2015. № 1187 (as amended by the resolution of the Cabinet of Ministers of Ukraine dated 24.03.2021. № 365)  
URL: <https://zakon.rada.gov.ua/laws/show/1187-2015-%D0%BF#Text>
4. National Classifier of Ukraine: Classification of Economic Activities  
Національний класифікатор України: ДК 009: 2010 (with changes made from 24.02.2020.)  
URL: <https://zakon.rada.gov.ua/rada/show/vb457609-10#Text>
5. National Qualifications Framework.  
URL: <https://nqa.gov.ua/national-qualification-frame/>
6. National classifier ДК 003:2010 Classification of professions (with changes made since 16.01.2024.).  
URL: <https://zakon.rada.gov.ua/rada/show/va327609-10#Text>