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Федеральное государственное автономное образовательное учреждение высшего образования
«Российский университет дружбы народов имени Патриса Лумумбы»

Институт экологии

(наименование основного учебного подразделения (ОУП) – разработчика ОП ВО)

Утверждена на заседании Ученого
совета РУДН протокол № 9
от « 25 » апреля 2022 г.

Открыта приказом ректора РУДН
№ 315
от « 17 » мая 2022 г.

**ОСНОВНАЯ ПРОФЕССИОНАЛЬНАЯ ОБРАЗОВАТЕЛЬНАЯ ПРОГРАММА
ВЫСШЕГО ОБРАЗОВАНИЯ (ОП ВО)**

Направление подготовки/специальность:

05.03.06 Экология и природопользование

(код и наименование направления подготовки/специальности)

Направленность (профиль/специализация):

**Environmental Engineering in Construction / Экологическая инженерия в
строительстве**

(наименование ОП ВО)

Образовательная программа разработана в соответствии с требованиями:

ОС ВО РУДН, утвержденного приказом ректора № 371 от «21» мая 2021 г.

Уровень образования:

магистратура

(бакалавриат/специалитет/магистратура/ординатура – вписать нужное)

Квалификация выпускника:

магистр

(квалификация выпускника в соответствии с приказом Минобрнауки России от 12.09.2013 г. №1061)

Срок получения образования по ОП ВО:

2 года

(очная форма обучения)

-

(очно-заочная форма обучения)

2 года 6 месяцев

(заочная форма обучения)

Сведения об особенностях реализации программы: реализуется в рамках сетевого взаимодействия (двойной диплом, одно направление) совместно с Национальным исследовательским Московским государственным строительным университетом, на английском языке.

СОГЛАСОВАНО:

Руководитель ОП ВО

Кучер Д.Е.



(подпись)

« ___ » _____ 2023 г.

Председатель МССН

Харламова М.Д.

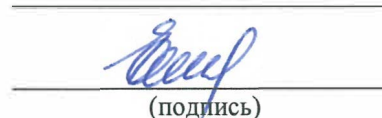


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Руководитель ОУП

Савенкова Е.В.



(подпись)

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2023 г.

1. EDUCATIONAL PROGRAMME GOAL (MISSION)

The mission of the joint interdisciplinary educational program Environmental Engineering in Construction (in Russian and English using distance learning technologies) is joint training of a highly qualified specialist in the field of ecological construction, energy efficiency and rational use of natural resources.

Environmental Engineering is an interdisciplinary program within two areas of training: "Construction" and "Ecology and Nature Management", it not only studies such subjects as hydrology, water ecology, urban ecosystems, environmental management, water supply for enterprises and settlements, but also focuses on the "chemical" side of environmental protection, based on the study of water treatment technologies.

Much attention in the program is paid to the in-depth study of the physico-chemical laws and processes of obtaining drinking water from surface and underground sources, cleaning of household and industrial wastewater of cities and industrial enterprises, technologies for disinfection of treated water and disposal of the resulting precipitation, which reduce the negative impact of production on the environment. The issues of monitoring the quality of water bodies, modeling and optimization of technological processes of water treatment, environmental expertise of wastewater treatment and precipitation treatment facilities, integrated management of water resources of territories are studied in depth.

The program includes studies of the impact of construction projects on the environment, the causes, consequences and measures to prevent negative impacts on it, including modern green and energy-saving technologies aimed at the careful and rational use of natural resources. In order to form managerial competencies among students, the program provides for such disciplines as Leadership and team management, Project management, Organization and management of construction activities. To obtain competencies in the field of digitalization of the urban environment and the implementation of the "smart city" concept, the discipline Digital Technologies in Construction was introduced.

In the field of education, the purpose of this (Higher Education Programme Structure) is the formation of socio-personal qualities of undergraduates that contribute to the strengthening of morality, the development of general cultural needs, creative abilities, social adaptation, communication, tolerance, perseverance in achieving goals, endurance and physical culture.

2. EDUCATIONAL PROGRAMME RELEVANCE, SPECIFICITY, AND UNIQUENESS

Improving the environment through the use of modern technologies for managing its quality, improving the quality of life and rational use of resources, is one of the fastest growing areas of human activity.

The program "Environmental Engineering in Construction" gives students the opportunity to become qualified specialists who will be able to develop, design, adjust, operate and improve environmental protection equipment and technology; organize

environmental work at enterprises and territorial-industrial complexes; conduct an examination of projects, technologies and productions in order to achieve maximum environmental safety of human economic activity and reduce the risk of anthropogenic impact on the environment; manage design, survey and construction companies.

Students enrolled in this program receive specialized training in the field of rational management and environmental regulation and law, which will allow them to apply their knowledge in the field of environmental management and engineering expertise.

The uniqueness of this program is evidenced by the following competitive advantages, which consist in the possibility of:

improvements in the process of learning management skills, organization, team building;

obtaining design skills in the information modeling technology system (BIM-technology);

use of the most modern means and technologies of training;

internships at major Russian and international universities and companies, get acquainted with the labor market and the latest equipment;

comprehensive development of research and practical skills of students with participation in the implementation of educational and scientific-practical projects in cooperation with government organizations, institutes and leading enterprises.

3. LABOUR MARKET NEEDS FOR PERSONNEL TRAINING IN EDUCATIONAL PROGRAMME PROFILE

Graduates of the Environmental Engineering in Construction program, having good theoretical and practical training in performing functional duties, meet the modern scientific and technical level and are in demand qualified specialists. Fluent in computer design, having the skills of independent scientific and practical activity, the ability to use regulatory documents and perform calculation tasks, graduates of the program have a wide range of employment opportunities for various vacancies and positions, for example, chief engineer, project manager, head of technical supervision department.

In the course of training and participation in practical work, students receive the necessary competencies, contacts, support (recommendations) to work in large Russian and international corporations, government agencies, research organizations in the field of construction, protection and environmental protection.

Directions of career growth of graduates of the program:

- work as specialists and managers in companies engaged in the design and implementation of projects related to the construction of both new and repurposing, reconstruction of existing construction facilities for various purposes;
- work in organizations that carry out the whole range of survey work;
- work in the field of operation, reconstruction, repair and modernization of water supply and sanitation systems and structures in cities and at production facilities for various purposes;

- work in public and private companies managing real estate in the field of urban and communal services;
- work in state bodies regulating environmental and construction activities;
- work in various organizations that implement private, public orders and targeted programs in the field of construction and ecology.

Potential consumers of graduates of the educational program are:

- municipal and regional structures engaged in the protection of the environment and natural resources, design and construction, rational use of natural resources;
- municipal and regional structures that carry out activities in the field of management of construction and operation of facilities;
- enterprises of various forms of ownership, environmental protection laboratories, labor protection;
- research, design and survey organizations and centers whose activities are related to the development and improvement of innovative design and construction technologies or the solution of environmental problems from their impact;
- public and international public organizations.

4. SPECIAL REQUIREMENTS FOR POTENTIAL APPLICANTS

Applicants who have the first higher (first stage of higher) education in the profile of the master's program and who want to improve their professional level and acquire additional competencies can enroll in the educational program. It is also possible to enroll applicants with non-core education in related fields (economics, instrumentation, law).

The applicant must have the appropriate competencies to master the program «Environmental engineering in construction»:

- possess a culture of thinking, the ability to generalize, analyze, perceive information, set goals and choose ways to achieve it;
- be aware of the social significance of their future profession, possess high motivation to perform professional activities, the ability to find professional solutions, including in non-standard situations and willingness to take responsibility for them;
- be ready to perform professional functions when working in a team;
- have basic fundamental training in the field of natural sciences and mathematics;
- be able to apply information technology to solve technical problems;
- be able to use (read) graphic and cartographic documentation;
- to orientate oneself in the techniques and technologies of protecting the environment and humans from man-made hazards, to promote the goals and objectives of ensuring the safety of humans and the natural environment in the technosphere;
- know the standards of the levels of permissible negative impacts on humans and the natural environment;
- understand technical documentation related to technological processes;

- be able to read and understand specialized technical literature;
- have experience of participating in research projects on the profile of training;
- be able to systematize scientific information, process the received data.

5. FEATURES OF EDUCATIONAL PROGRAMME IMPLEMENTATION

5.1 Higher Education Program implemented with elements of distance learning technologies (TUIS, Massive Open Online Course, lectures/seminars on the Microsoft Teams platform, other available DOT services).

5.2. The language of the Educational Programme implementation is Russian and English.

5.3. The Educational Programme does not provide for education of people with disabilities.

5.4. The higher education programme is implemented by the Federal State Autonomous Educational Institution of Higher Education "Peoples' Friendship University of Russia" together with Federal state budget educational institution of higher education «Moscow State University of Civil Engineering»

Information about partner organizations participating in the implementation of the Higher Education Program (educational and scientific organizations, company).

| Name of partner organisation | Interaction functionality |
|---|---|
| Federal state budget educational institution of higher education «Moscow State University of Civil Engineering» | Training of masters within the framework of individual disciplines of semesters |

5.5. The information on the planned introductory/advanced field internships and (or) research & development internships

| Name of internship | The base of practice (name of the organization, city) |
|-------------------------|--|
| pre-graduate internship | ICE center «VidProject» |
| pre-graduate internship | Design and construction organizations Moscow and the Moscow region |
| pre-graduate internship | Survey organizations in Moscow and Moscow Region |
| research practice | NRU MGSU |
| research practice | Research institutes of Moscow |

6. CHARACTERISTICS OF EDUCATIONAL PROGRAMME GRADUATE'S PROFESSIONAL ACTIVITIES

6.1. The field of professional activity of a graduate who has mastered

The field of professional activity of graduates of the training program "Environmental engineering in construction" includes design, survey, research, production, marketing, consulting, economic, legal, training, expert departments, departments, bureaus, centers, companies, institutes in the field of construction, ecology and environmental management.

Professional activity is aimed at ensuring human safety in the modern world during the construction and operation of facilities, the use of environmentally friendly materials and structures, project management for the formation of a comfortable technosphere for human life and activity, minimizing man-made impacts on the natural environment, preserving human life and health by the use of modern technical means, methods of control, monitoring and forecasting.

6.2. Types of tasks of professional activity for which the graduate is preparing to solve within the framework of the Higher Education Program

A master's degree in the basic, practice-oriented educational program "Environmental engineering in construction" should be prepared to solve professional tasks in accordance approved by Order of the Ministry of Education and Science of Russian Federation and with the profile orientation of the magistracy.

A graduate of the master's degree program must possess the following types of professional activity, namely, have knowledge, skills and abilities in the field of design and production activities and organizational and managerial activities.

6.3. The list of generalised labour functions and labour functions which are related to the professional activities of the Educational Programme graduate and are taken into account in the course of its development.*

| Code and title of occupational standard | Generalised labour functions | | | Labour functions | | |
|---|------------------------------|---|---------------------|--|------------|--------------------------------|
| | Code | Title | Qualification level | Type | Code | Qualification level (sublevel) |
| 40.117 "Environmental safety specialist (in industry)" | C | Development and implementation of measures to improve the effectiveness of environmental activities of the organization | 6 | Conducting environmental analysis of projects for expansion, reconstruction, modernization of existing production facilities, new technologies and equipment being created in the organization | C/0 1.6 | 6 |
| | | | | Development and ecological and economic justification of plans for the introduction of new | C/0 3.6 | 6 |

| Code and title of occupational standard | Generalised labour functions | | | Labour functions | | |
|--|------------------------------|---|---------------------|---|------------|--------------------------------|
| | Code | Title | Qualification level | Type | Code | Qualification level (sublevel) |
| | | | | | | |
| | | | | environmental protection equipment and technologies in the organization | | |
| | | | | Economic regulation of environmental activities of the organization | C/0 5.6 | 6 |
| | | | | Organization of training of the organization's personnel in the field of environmental safety | C/0 6.7 | 6 |
| 40.117 "Environmental safety specialist (in industry)" | B | Planning and documentation of environmental activities of the organization | 5 | Maintaining documentation on the regulation of the impact of the organization's production activities on the environment | B/0 2.5 | 5 |
| | | | | Planning and documentary support of activities to comply with or achieve standards of permissible environmental impact | B/0 3.5 | 5 |
| | | | | Registration of accounting documentation on the environmental activities of the organization | B/0 5.5 | 5 |
| 16.006 "Waste management specialist" | B | Coordination of organization and control activities in the field of production and consumption waste management | 6 | Control of waste management activities | B/0 1.6 | 6 |
| | | | | Organization of infrastructure for environmentally safe neutralization and processing of production and consumption waste | B/0 2.6 | 6 |

| Code and title of occupational standard | Generalised labour functions | | | Labour functions | | |
|---|------------------------------|--|---------------------|--|------------|--------------------------------|
| | Code | Title | Qualification level | Type | Code | Qualification level (sublevel) |
| 10.004 "Specialist in the field of expertise of project documentation and engineering survey results" | B | Examination of the results of engineering surveys of capital construction facilities and execution of conclusions and reports on the results | 7 | Carrying out the results of the examination of the survey of the capital construction object | B/0 1.7 | 7 |
| 16.007 "Water treatment plant operation specialist" | B | Management of the structural unit for the operation of water treatment plants | 6 | Planning and control of water treatment plant operation activities | B/0 1.6 | 6 |
| | | | | Organization of technical and material support for the operation of a water treatment plant | B/0 2.6 | 6 |
| | | | | Management of the operation of the water treatment plant | B/0 3.6 | 6 |
| | | | | Organization of work with personnel engaged in the operation of the water treatment plant | B/0 4.6 | 6 |

* The wording of labour functions is taken from the relevant Occupational Standards.

7. REQUIREMENTS FOR EDUCATIONAL PROGRAMME OUTCOMES

7.1. Upon completion of the Educational Programme, the graduate is expected to acquire the following Generic Competences (GCs):

| Code and descriptor of generic competence | Code and competence level indicator |
|---|--|
| GC-1. able to carry out a critical analysis of problem situations based on a systematic approach, to develop a strategy of actions. | GC--1.1. analyzes the task, highlighting its basic components; |
| | GC--1.2. defines and ranks the information required to solve the task; |
| | GC--1.3. searches for information to solve the task by various types of queries; |

| Code and descriptor of generic competence | Code and competence level indicator |
|---|--|
| | <p>GC--1.4.offers solutions to the problem, analyzes the possible consequences of their use</p> <p>GC--1.5.analyzes the ways of solving problems of a philosophical, moral and personal nature based on the use of basic philosophical ideas and categories in their historical development and socio-cultural context.</p> |
| GC-2 Able to manage the project at all stages of its life cycle | <p>GC--2.1.formulates a problem, the solution of which is directly related to the achievement of the project goal</p> <p>GC--2.2.defines the links between the tasks set and the expected results of their solution</p> <p>GC--2.3.within the framework of the tasks set, it determines the available resources and restrictions, the current legal norms</p> <p>GC--2.4. analyzes the schedule for the implementation of the project as a whole and chooses the optimal way to solve the tasks, based on the current legal norms and available resources and limitations</p> <p>GC--2.5. monitors the progress of the project, adjusts the schedule in accordance with the results of the control</p> |
| GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | <p>GC--3.1. defines his role in the team based on the strategy of cooperation to achieve the goal</p> <p>GC--3.2. formulates and takes into account in its activities the peculiarities of the behavior of groups of people, identified depending on the goal</p> <p>GC--3.3.analyzes the possible consequences of personal actions and plans his actions to achieve the desired result</p> <p>GC--3.4.exchanges information, knowledge and experience with team members</p> <p>GC--3.5.argues his point of view regarding the use of the ideas of other team members to achieve the goal</p> <p>GC--3.6.participates in team work on the execution of assignments</p> |
| GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | <p>GC--4.1.chooses the style of business communication, depending on the language of communication, the purpose and conditions of partnership</p> <p>GC--4.2.adapts speech, communication style and sign language to interaction situations</p> <p>GC--4.3.searches for the necessary information to solve standard communication tasks in Russian and foreign languages</p> <p>GC--4.4.conducts business correspondence in Russian and foreign languages, taking into account the peculiarities of the style of official and unofficial letters and socio-cultural differences in the format of correspondence</p> <p>GC--4.5. uses dialogue for cooperation in academic communication, taking into account the personality of the interlocutors, their communicative speech strategy and tactics, the degree of formality of the situation</p> |

| Code and descriptor of generic competence | Code and competence level indicator |
|---|--|
| | GC--4.6.forms and argues its own assessment of the main ideas of the participants of the dialogue (discussion) in accordance with the needs of joint activities |
| GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction | GC--5.1.interprets the history of Russia in the context of world historical development |
| | GC--5.2. finds and uses information about cultural peculiarities and traditions of various social groups in social and professional communication |
| | GC--5.3.in social and professional communication on a given topic, it takes into account the historical heritage and socio-cultural traditions of various social groups, ethnic groups and confessions, including world religions, philosophical and ethical teachings |
| | GC--5.4.collects information on a given topic, taking into account the ethnic groups and faiths most widely represented at the research sites |
| | GC--5.5.substantiates the specifics of project and team activities with representatives of other ethnic groups and (or) confessions |
| | GC--5.6.adheres to the principles of non-discriminatory interaction in personal and mass communication in order to fulfill professional tasks and strengthen social integration |
| GC-6able to determine and implement the priorities of his own activities and ways to improve it based on self-assessment. | GC--6.1. controls the amount of time spent on specific activities |
| | GC--6.2.develops tools and methods of time management when performing specific tasks, projects, goals |
| | GC--6.3.analyzes its resources and their limits (personal, situational, temporary, etc.), for the successful completion of the task |
| | GC--6.4. allocates tasks for long-, medium- and short-term with justification of relevance and analysis of resources for their implementation |
| GC-7 Digital literacy | GC--7.1. searches for the necessary sources of information and data, perceives, analyzes, remembers and transmits information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems |
| | GC--7.2.evaluates information, its reliability, builds logical conclusions based on incoming information and data |

7.2. Upon completion of the Educational Programme, the graduate is expected to acquire the following general professional competences (GPCs):

| Code and descriptor of general professional competence | Code and competence level indicator |
|--|--|
| GPC-1 able to use philosophical concepts and methodology of scientific cognition in the study of | GPC-1.1. knows the interrelation of intuitive, unconscious and conscious in scientific creativity, social and psychological motives of scientific creativity; problems of moral evaluation of scientific creativity; bioethics; integrative trends of modern cognition |

| Code and descriptor of general professional competence | Code and competence level indicator |
|--|---|
| various levels of organization of matter, space and time. | GPC-1.2. uses the positions and categories of philosophy to evaluate and analyze various social trends, facts and phenomena related to the modern development of natural science and technology |
| | GPC-1.3. has the skills of historical and methodological analysis of scientific research and its results; all types of scientific communication; methods of discussion and polemics, public speaking skills and written reasoned presentation of his own point of view |
| GPC-2 able to use special and new sections of ecology, geocology and nature management in solving research and applied tasks of professional activity. | GPC-2.1. has a systematic understanding of the theoretical and methodological foundations of environmental regulation |
| | GPC-2.2. knows basic knowledge of fundamental sections of biology to the extent necessary for mastering the basics in ecology and nature management |
| | GPC-2.3. possesses modern methods of obtaining and evaluating geochemical information for solving theoretical and practical problems of OS geochemistry in the field of ecology and nature management in order to protect the environment |
| GPC-3 able to apply environmental research methods to solve scientific research and applied tasks of professional activity. | GPC-3.1.able to identify and has the skills to solve problems, tasks of scientific research in the field of geography of cities, environmental problems of cities. |
| | GPC-3.2. possesses modern methods of assessing geocological information for solving theoretical and practical problems of nature management. |
| | GPC-3.3. has the skills of forecasting meteorological reactions, assessing the climatic potential of regions, assessing the objectivity of climate scenarios of climate change. |
| GPC-4 able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management. | GPC-4.1. focuses on the modern system of regulatory and legal support for engineering and environmental surveys and environmental impact assessment of urban agglomerations. |
| | GPC-4.2. knows the international practice of development and harmonization, as well as the application of environmental standards. |
| | GPC-4.3. has the skills to analyze the need for environmental protection measures based on the application of environmental standards, the skills to select and apply indicators for environmental expertise and forms of environmental control based on environmental standards. |
| GPC-5 able to solve the tasks of professional activity in the field of ecology, nature management and nature protection using information and communication, including | GPC-5.1. knows the theoretical, methodological and practical foundations of the use of information technology in environmental expertise. |
| | GPC-5.2. owns modern methods of environmental information assessment for solving theoretical and practical problems of environmental safety expertise of nature management. |

| Code and descriptor of general professional competence | Code and competence level indicator |
|--|---|
| geoinformation technologies. | GPC-5.3. knows how to choose and apply an algorithm for solving environmental problems and implements algorithms using software tools. |
| GPC-6 able to design, present, defend and disseminate the results of his professional activity, including research. | GPC-6.1.able to use information resources, scientific, experimental and instrument bases on the subject of ongoing research. |
| | GPC-6.2. able to formulate the results obtained in the course of solving research problems. |
| | GPC-6.3. able to identify scientific (scientific and technical) results of practical importance. |
| GPC-1-c. able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences | GPC-1.1-c. able to apply the theoretical and practical foundations of fundamental sciences in solving professional problems. |
| | GPC-1.2-c. able to conduct a preliminary analysis of the consequences of the information obtained during the study. |
| | GPC-1.3-c. able to solve professional problems based on the use of knowledge of the mathematical apparatus of fundamental sciences. |
| GPC-2-c. able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including with the help of information technology | GPC-2.1-c. uses modern databases, methods of obtaining and working with information of theoretical and empirical levels, GIS technologies. |
| | GPC-2.2-c. able to critically evaluate the received scientific and technical information when solving professional tasks. |
| | GPC-2.3-c. able to apply the acquired new knowledge in the field of construction, the construction industry and housing and communal services. |
| GPC-3-c. able to set and solve scientific and technical problems in the field of construction, the construction industry and housing and communal services based on knowledge of the problems of the industry and experience in solving them | GPC-3.1-c. able to solve standard tasks of professional activity in the field of construction, construction industry and housing and communal services, including using geoinformation technologies |
| | GPC-3.2-c. has the skills to solve scientific and technical problems in the professional field based on modern methods |
| | GPC-3.3-c. able to apply professional knowledge in solving scientific and technical problems in the field of construction, the construction industry and housing and communal services. |
| GPC-4-c. able to use and develop design, administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services | GPC -4.1-c. guided by the modern system of regulatory and legal support for engineering and construction surveys. |
| | GPC -4.2-c.able to develop regulatory legal acts in the field of the construction industry and housing and communal services. |
| | GPC-4.3-c. has practical skills in the development of design and production documentation in the construction industry and housing and communal services. |
| GPC-5-c. able to conduct and organize design and survey work in the field of | GPC -5.1-c. able to carry out planning and organization of design and survey work in the field of construction and housing and communal services. |

| Code and descriptor of general professional competence | Code and competence level indicator |
|---|---|
| construction and housing and communal services, carry out technical expertise of projects and supervision of their compliance | GPC -5.2-c. able to carry out design and survey activities and audit, as well as to carry out technical expertise of projects and supervision of their compliance in the field of construction and housing and communal services. |
| GPC-6-c. capable of carrying out research of objects and processes in the field of construction and housing and communal services | GPC -6.1-c. capable of conducting scientific and practical research in the field of construction and housing and communal services. |
| | GPC -6.2-c. able to evaluate the scientific and technical results obtained in Russia and (or) abroad in new and (or) promising scientific areas in the field of construction and housing and communal services. |
| | GPC -6.3-c. has the skills to carry out research of objects and processes in the field of construction and housing and communal services. |
| GPC-7-c. Able to manage an organization operating in the construction industry and housing and communal services, organize and optimize its production activities | GPC -7.1-cable to organize the activities of enterprises in the field of construction and housing and communal services. |
| | GPC -7.2-c able to make strategic and operational decisions when managing an enterprise in the construction and housing and communal services sector. |
| | GPC -7.3-c has the skills to optimize production activities in the field of construction, construction industry and housing and communal services. |

7.3. Upon completion of the Educational Programme, the graduate is expected to acquire the following professional competences (PCs)

| Code and descriptor of professional competence | Code and competence level indicator | Code and title of occupational standard for relevant PC |
|---|---|---|
| In organizational and managerial activities: | | |
| PC-1 able to carry out an expert examination of design solutions for industrial and civil construction facilities, including in the field of environmental management | PC-1.1. capable of carrying out environmental protection measures to maintain environmental safety and rational use of natural resources | 40.117"Environmental safety specialist (in industry)" |
| | PC-1.2.capable of carrying out expert examination of the results of engineering surveys of industrial and civil construction facilities | 10.004 "Specialist in the field of expertise of project documentation and engineering survey results" |
| PC-2 able to diagnose environmental protection problems, develop | PC-2.1. able to predict possible adverse changes in the natural and man-made environment, to conduct a preliminary analysis of the consequences of the information obtained during the study; | 40.117 "Environmental safety specialist (in industry)" |

| Code and descriptor of professional competence | Code and competence level indicator | Code and title of occupational standard for relevant PC |
|--|--|--|
| In organizational and managerial activities: | | |
| standard environmental protection measures and practical recommendations for ensuring sustainable development and assess the impact of planned structures or other forms of economic activity on the environment | PC-2.2.able to analyze environmental monitoring data, make preliminary conclusions about the state of the facility and the environment | 16.006 "Waste management specialist" |
| | PC-2.3. able to assess the environmental impact of the projected enterprise and structures, predict and assess negative consequences | |
| PC-3 able to carry out and organize scientific research of industrial and civil construction facilities, including in the field of environmental management | PC-3.1. able to study the natural, man-made, socio-economic, demographic and biomedical situation, to search for cultural heritage objects in the study area, to explore industrial and civil construction facilities | 10.004 "Specialist in the field of expertise of project documentation and results of engineering surveys" 40.117 "Specialist in environmental safety (in industry)" |
| | PC-3.2. has the skills to carry out studies of environmental objects, including industrial and civil construction, on chemical, microbiological, parasitological, toxicological indicators | |
| | PC-3.3. able to collect and analyze information about the natural and man-made environment, physical, geographical and climatic conditions, including in industrial and civil construction, based on materials from previous years | |
| In design and production activities: | | |
| PC-4 capable of developing design solutions and measures to ensure the safety of industrial and civil construction facilities | PC-4.1. capable of developing standard environmental protection measures, monitoring the state of the environment to ensure the safety of industrial and civil construction facilities | 40.117 "Environmental safety specialist (in industry)" 16.006 "Waste management specialist" |
| | PC-4.2. has the skills of environmental design and preparation of special documentation at the pre-project stage of the project life cycle | |
| | PC-4.3. capable of carrying out the necessary calculations for planning, modeling and forecasting the development of a territorial object | |
| PC-5 able to develop design solutions and organize design in the field of industrial and civil construction | PC-5.1.able to develop projects, project documentation in the field of industrial and civil construction | 16.007 "Specialist in the operation of water treatment plants" |
| | PC-5.2.has the skills to conduct an examination of project documentation of engineering and survey activities | |
| | PC-5.3.able to organize the activities of the enterprise and staff training in the field of industrial and civil construction | 10.004 "Specialist in the field of expertise of project documentation and |

| Code and descriptor of professional competence | Code and competence level indicator | Code and title of occupational standard for relevant PC |
|---|-------------------------------------|---|
| In organizational and managerial activities: | | |
| | | engineering survey results" |

*The Educational Programme's developer formulates the PC, taking into account the requirements of occupational standards and the Educational Programme field of study.

8. MATRIX OF COMPETENCES that students acquire when mastering the Educational Programme Environmental Engineering in Construction, implemented under the RUDN University Academic Council decision dated " _ " _____ 20__ (Protocol No.

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | GC-7 Digital literacy |
|-----------------|---|--|--|--|---|---|--|-----------------------|
| | | GC-1 able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of actions. | GC-2 able to manage the project at all stages of its life cycle. | GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction. | GC-6 able to identify and implement the priorities of his own activities and ways to improve it based on self-assessment | |
| Block 1. | Disciplines (modules) | | | | | | | |
| B1.O | Mandatory part | | | | | | | |
| B1.O.01 | Core component | | | | | | | |
| B1.O.01.01 | Leader ship and Team management | | | GC-3.1 GC-3.2 GC-3.3 GC-3.4 GC-3.5 GC-3.6 | GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6 | GC-5.1 GC-5.2 GC-5.3 GC-5.4 GC-5.5 GC-5.6 | GC-6.1 GC-6.2 GC-6.3 GC-6.4 | |
| B1.O.01.02 | Foreign language for professional communication | | | | GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 | | | |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | GC-7 Digital literacy |
|------------|---|--|--|--|---|---|--|-----------------------|
| | | GC-1 able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of actions. | GC-2 able to manage the project at all stages of its life cycle. | GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction. | GC-6 able to identify and implement the priorities of his own activities and ways to improve it based on self-assessment | |
| | | | | | GC-4.6 | | | |
| B1.O.01.03 | Regulation System in Construction | | | | | | | GC-7.1 GC-7.2 |
| B1.O.01.04 | Mathematical modeling | GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 | | | GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6 | | | |
| B1.O.01.05 | Organization and management in construction | | GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5 | | | | | |
| B1.O.01.06 | Digital technologies in Civil Engineering | | | | | | | GC-7.1 GC-7.2 |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | GC-7 Digital literacy |
|----------------|--|--|--|--|---|---|--|-----------------------|
| | | GC-1 able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of actions. | GC-2 able to manage the project at all stages of its life cycle. | GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction. | GC-6 able to identify and implement the priorities of his own activities and ways to improve it based on self-assessment | |
| B1.O.01.07 | Environmental rationing | | | | | | | |
| B1.O.02 | Variable component | | | | | | | |
| B1.O.02.01 | Fundamentals of scientific research | GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 | | | | | | |
| B1.O.02.02 | Urban water management and climate change adaptation | | | | | | | |
| B1.O.02.03 | Sustainable development of urban areas | | | | | | | |
| B1.O.02.04 | Project management | | | | | | | |
| B1.O.02.05 | Theoretical foundations and design methods of pipeline systems for water supply and sanitation | | | | | | | |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | GC-7 Digital literacy |
|---------------|---|--|--|--|---|---|--|-----------------------|
| | | GC-1 able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of actions. | GC-2 able to manage the project at all stages of its life cycle. | GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction. | GC-6 able to identify and implement the priorities of his own activities and ways to improve it based on self-assessment | |
| B1.O.02.06 | Management of operation of water supply and sanitation systems | | | | | | | |
| B1.O.02.07 | Regional and municipal waste management systems | | | | | | | |
| B1.O.02.08 | Urban development and environmental engineering surveys | | | | | | | |
| B1.O.02.09 | Regional geoecology and urban ecology | | | | | | | |
| B1.O.02.10 | Dynamics of environmental systems | | | | | | | |
| B1.B | The part formed by the participants of educational relations | | | | | | | |
| B1.B.DB.01.01 | Natural water conditioning systems | | | | | | | |
| B1.B.DB.01.02 | Assessments of water bodies environment of urban areas | | | | | | | |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | GC-7 Digital literacy |
|---------------|---|--|--|--|---|---|--|-----------------------|
| | | GC-1 able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of actions. | GC-2 able to manage the project at all stages of its life cycle. | GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction. | GC-6 able to identify and implement the priorities of his own activities and ways to improve it based on self-assessment | |
| Б1.В.ВВ.02.01 | Green areas and protected areas in the city | | | | | | | |
| Б1.В.ВВ.02.02 | Blue -green urban infrastructure | | | | | | | |
| Б1.В.ВВ.03.01 | Urban Ecosystems | | | | | | | |
| Б1.В.ВВ.03.02 | Environmental control and monitoring of urban environment | | | | | | | |
| Б1.В.ВВ.04.01 | Hydrological Modelling | | | | | | | |
| Б1.В.ВВ.04.02 | Modeling of water supply and wastewater disposal systems | | | | | | | |
| Б1.В.ВВ.05.01 | Life cycle analysis of construction object | | | | | | | |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | GC-7 Digital literacy |
|----------------|---|--|--|--|---|---|--|-----------------------|
| | | GC-1 able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of actions. | GC-2 able to manage the project at all stages of its life cycle. | GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction. | GC-6 able to identify and implement the priorities of his own activities and ways to improve it based on self-assessment | |
| B1.B.DB.05.02 | Social adaptation of persons with disabilities in the conditions of professional activity | | | | | | | |
| B2 | PRACTICE | | | | | | | |
| B2.O | Mandatory part | | | | | | | |
| B2.O.01 | Core component | | | | | | | |
| B2.O.01 | Educational practice, introductory | GC-1.2 GC-1.3 GC-1.4 GC-1.5 | | | | | | |
| B2.O.02 | Industry practice, performing | | | | | | | |
| B2.B | The part formed by the participants of educational relations | | | | | | | |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | GC-7 Digital literacy |
|-----------|---|--|--|--|---|---|--|-----------------------|
| | | GC-1 able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of actions. | GC-2 able to manage the project at all stages of its life cycle. | GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction. | GC-6 able to identify and implement the priorities of his own activities and ways to improve it based on self-assessment | |
| B2.B.01 | Applied scientific research | | | | | | | |
| B2.B.02 | Industrial practice, pre -diploma | | | | | | | |
| B3 | Final State Examination | | | | | | | |
| B3.O.01 | State Exam | GC-1.2 GC-1.3 GC-1.4 GC-1.5 | GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5 | GC-3.1 GC-3.2 GC-3.3 GC-3.4 GC-3.5 GC-3.6 | GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6 | GC-5.1 GC-5.2 GC-5.3 GC-5.4 GC-5.5 GC-5.6 | GC-6.1 GC-6.2 GC-6.3 GC-6.4 | GC-7.1 GC-7.2 |
| B3.O.02 | Degree Diploma | GC-1.2 GC-1.3 GC-1.4 GC-1.5 | GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5 | GC-3.1 GC-3.2 GC-3.3 GC-3.4 GC-3.5 GC-3.6 | GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6 | GC-5.1 GC-5.2 GC-5.3 GC-5.4 GC-5.5 GC-5.6 | GC-6.1 GC-6.2 GC-6.3 GC-6.4 | GC-7.1 GC-7.2 |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | GC-7 Digital literacy |
|--------------|--|--|--|--|---|---|--|-----------------------|
| | | GC-1 able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy of actions. | GC-2 able to manage the project at all stages of its life cycle. | GC-3 able to organize and manage the work of the team, developing a team strategy to achieve the goal. | GC-4 able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction. | GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction. | GC-6 able to identify and implement the priorities of his own activities and ways to improve it based on self-assessment | |
| OD | Optional Disciplines | | | | | | | |
| OD.01 | Foreign language | | | | GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6 | | | |
| OD.02 | Information modeling technologies for energy-saving construction | | | | | | | |
| OD.03 | Programming technologies Python | | | | | | | |
| OD.04 | Information databases | | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | |
|-----------------|---|--|--|--|--|---|--|
| | | GPC-1-ə able to use philosophical concepts and methodology of scientific cognition in the study of various levels of organization of matter, space and time. | GPC-2-ə able to use special and new sections of ecology, geoeology and nature management in solving research and applied tasks of professional activity. | GPC-3-ə able to apply environmental research methods to solve research and applied tasks of professional activity. | GPC-4 -ə able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management. | GPC-5-ə able to solve the tasks of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies. | GPC-6-ə able to design, present, defend and disseminate the results of his professional activity, including research |
| Block 1. | Disciplines (modules) | | | | | | |
| B1.O | Mandatory part | | | | | | |
| B1.O.01 | Core component | | | | | | |
| B1.O.01.01 | Leadership and Team management | | | | | | |
| B1.O.01.02 | Foreign language for professional communication | | | | | | |
| B1.O.01.03 | Regulation System in Construction | | | | GPC-4.1-ə GPC-4.2-ə GPC-4.3-ə | | |
| B1.O.01.04 | Mathematical modeling | | | | | GPC-5.1-ə GPC-5.2-ə GPC-5.3-ə | |
| B1.O.01.05 | Organization and management in construction | | | | | | |
| B1.O.01.06 | Digital technologies in Civil Engineering | | | | | GPC-5.1-ə GPC-5.2-ə GPC-5.3-ə | |
| B1.O.01.07 | Environmental rationing | | | | GPC-4.1-ə | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | |
|----------------|--|--|---|--|---|---|--|
| | | GPC-1-ə able to use philosophical concepts and methodology of scientific cognition in the study of various levels of organization of matter, space and time. | GPC-2-ə able to use special and new sections of ecology, geoecology and nature management in solving research and applied tasks of professional activity. | GPC-3-ə able to apply environmental research methods to solve research and applied tasks of professional activity. | GPC-4-ə able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management. | GPC-5-ə able to solve the tasks of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies. | GPC-6-ə able to design, present, defend and disseminate the results of his professional activity, including research |
| | | | | | GPC-4.2-ə GPC-4.3-ə | | |
| B1.O.02 | Variable component | | | | | | |
| B1.O.02.01 | Fundamentals of scientific research | GPC-1.1-ə GPC-1.2-ə GPC-1.3-ə | GPC-2.1-ə GPC-2.2-ə GPC-2.3-ə | | | | |
| B1.O.02.02 | Urban water management and climate change adaptation | | GPC-2.1-ə GPC-2.2-ə GPC-2.3-ə | GPC-3.1-ə GPC-3.2-ə GPC-3.3-ə | | | |
| B1.O.02.03 | Sustainable development of urban areas | GPC-1.1-ə GPC-1.2-ə GPC-1.3-ə | GPC-2.1-ə GPC-2.2-ə GPC-2.3-ə | | | | |
| B1.O.02.04 | Project management | | | GPC-3.1-ə GPC-3.2-ə GPC-3.3-ə | GPC-4.1-ə GPC-4.2-ə GPC-4.3-ə | | GPC-6.1-ə GPC-6.2-ə GPC-6.3-ə |
| B1.O.02.05 | Theoretical foundations and design methods of pipeline systems for water supply and sanitation | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | |
|---------------|---|--|---|--|--|---|--|
| | | GPC-1-ə able to use philosophical concepts and methodology of scientific cognition in the study of various levels of organization of matter, space and time. | GPC-2-ə able to use special and new sections of ecology, geoecology and nature management in solving research and applied tasks of professional activity. | GPC-3-ə able to apply environmental research methods to solve research and applied tasks of professional activity. | GPC-4 -ə able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management. | GPC-5-ə able to solve the tasks of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies. | GPC-6-ə able to design, present, defend and disseminate the results of his professional activity, including research |
| B1.O.02.06 | Management of operation of water supply and sanitation systems | | | | | | |
| B1.O.02.07 | Regional and municipal waste management systems | | GPC-2.1-ə GPC-2.2-ə GPC-2.3-ə | | | | |
| B1.O.02.08 | Urban development and environmental engineering surveys | | | GPC-3.1-ə GPC-3.2-ə GPC-3.3-ə | | | |
| B1.O.02.09 | Regional geoecology and urban ecology | | GPC-2.1-ə GPC-2.2-ə GPC-2.3-ə | | | | |
| B1.O.02.10 | Dynamics of environmental systems | | GPC-2.1-ə GPC-2.2-ə GPC-2.3-ə | GPC-3.1-ə GPC-3.2-ə GPC-3.3-ə | | | |
| B1.B | The part formed by the participants of educational relations | | | | | | |
| B1.B.DB.01.01 | Natural water conditioning systems | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | |
|---------------|---|--|--|--|--|---|--|
| | | GPC-1-ə able to use philosophical concepts and methodology of scientific cognition in the study of various levels of organization of matter, space and time. | GPC-2-ə able to use special and new sections of ecology, geoeology and nature management in solving research and applied tasks of professional activity. | GPC-3-ə able to apply environmental research methods to solve research and applied tasks of professional activity. | GPC-4 -ə able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management. | GPC-5-ə able to solve the tasks of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies. | GPC-6-ə able to design, present, defend and disseminate the results of his professional activity, including research |
| B1.B.DB.01.02 | Assessments of water bodies environment of urban areas | | | | | | |
| B1.B.DB.02.01 | Green areas and protected areas in the city | | | | | | |
| B1.B.DB.02.02 | Blue -green urban infrastructure | | | | | | |
| B1.B.DB.03.01 | Urban Ecosystems | | | | | | |
| B1.B.DB.03.02 | Environmental control and monitoring of urban environment | | | | | | |
| B1.B.DB.04.01 | Hydrological Modelling | | | | | | |
| B1.B.DB.04.02 | Modeling of water supply and wastewater disposal systems | | | | | | |
| B1.B.DB.05.01 | Life cycle analysis of construction object | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | |
|----------------|---|--|--|--|---|---|--|
| | | GPC-1-ə able to use philosophical concepts and methodology of scientific cognition in the study of various levels of organization of matter, space and time. | GPC-2-ə able to use special and new sections of ecology, geocology and nature management in solving research and applied tasks of professional activity. | GPC-3-ə able to apply environmental research methods to solve research and applied tasks of professional activity. | GPC-4-ə able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management. | GPC-5-ə able to solve the tasks of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies. | GPC-6-ə able to design, present, defend and disseminate the results of his professional activity, including research |
| B1.B.DB.05.02 | Social adaptation of persons with disabilities in the conditions of professional activity | | | | | | |
| B2 | PRACTICE | | | | | | |
| B2.O | Mandatory part | | | | | | |
| B2.O.01 | Core component | | | | | | |
| B2.O.01 | Educational practice, introductory | GPC-1.1-ə GPC-1.2-ə GPC-1.3-ə | GPC-2.1-ə GPC-2.2-ə GPC-2.3-ə | | | | |
| B2.O.02 | Industry practice, performing | | | | GPC-4.1-ə GPC-4.2-ə GPC-4.3-ə | | GPC-6.1-ə GPC-6.2-ə GPC-6.3-ə |
| B2.B | The part formed by the participants of educational relations | | | | | | |
| B2.B.01 | Applied scientific research | | GPC-2.1-ə GPC-2.2-ə GPC-2.3-ə | GPC-3.1-ə GPC-3.2-ə GPC-3.3-ə | GPC-4.1-ə GPC-4.2-ə GPC-4.3-ə | GPC-5.1-ə GPC-5.2-ə GPC-5.3-ə | GPC-6.1-ə GPC-6.2-ə GPC-6.3-ə |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | |
|--------------|--|--|--|--|---|---|--|
| | | GPC-1-↔ able to use philosophical concepts and methodology of scientific cognition in the study of various levels of organization of matter, space and time. | GPC-2-↔ able to use special and new sections of ecology, geocology and nature management in solving research and applied tasks of professional activity. | GPC-3-↔ able to apply environmental research methods to solve research and applied tasks of professional activity. | GPC-4-↔ able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management. | GPC-5-↔ able to solve the tasks of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies. | GPC-6-↔ able to design, present, defend and disseminate the results of his professional activity, including research |
| B2.B.02 | Industrial practice, pre -diploma | | GPC-2.1-↔ GPC-2.2-↔ GPC-2.3-↔ | GPC-3.1-↔ GPC-3.2-↔ GPC-3.3-↔ | GPC-4.1-↔ GPC-4.2-↔ GPC-4.3-↔ | GPC-5.1-↔ GPC-5.2-↔ GPC-5.3-↔ | |
| B3 | Final State Examination | | | | | | |
| B3.O.01 | State Exam | GPC-1.1-↔ GPC-1.2-↔ GPC-1.3-↔ | GPC-2.1-↔ GPC-2.2-↔ GPC-2.3-↔ | GPC-3.1-↔ GPC-3.2-↔ GPC-3.3-↔ | GPC-4.1-↔ GPC-4.2-↔ GPC-4.3-↔ | GPC-5.1-↔ GPC-5.2-↔ GPC-5.3-↔ | GPC-6.1-↔ GPC-6.2-↔ GPC-6.3-↔ |
| B3.O.02 | Degree Diploma | GPC-1.1-↔ GPC-1.2-↔ GPC-1.3-↔ | GPC-2.1-↔ GPC-2.2-↔ GPC-2.3-↔ | GPC-3.1-↔ GPC-3.2-↔ GPC-3.3-↔ | GPC-4.1-↔ GPC-4.2-↔ GPC-4.3-↔ | GPC-5.1-↔ GPC-5.2-↔ GPC-5.3-↔ | GPC-6.1-↔ GPC-6.2-↔ GPC-6.3-↔ |
| OD | Optional Disciplines | | | | | | |
| OD.01 | Foreign language | | | | | | |
| OD.02 | Information modeling technologies for energy-saving construction | | | | | | |
| OD.03 | Programming technologies Python | | | | | | |
| OD.04 | Information databases | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|-----------------|---|---|---|---|---|---|--|--|
| | | GPC-1-c able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences. | GPC-2-c able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including through | GPC-3-c able to set and solve scientific and technical problems in the field of construction, the construction industry and housing and communal services based on knowledge of the problems of the industry and experience in solving them | GPC-4 -c able to use and develop design, administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services | GPC-5-c able to conduct and organize design and survey work in the field of construction and housing and communal services, carry out technical expertise of projects and supervision of their compliance | GPC-6-c capable of carrying out research of objects and processes in the field of construction and housing and communal services | GPC-7-c able to manage an organization operating in the construction industry and housing and communal services, organize and optimize its production activities |
| Block 1. | Disciplines (modules) | | | | | | | |
| B1.O | Mandatory part | | | | | | | |
| B1.O.01 | Core component | | | | | | | |
| B1.O.01.01 | Leadership and Team management | | | | | | | GPC-7.1-c GPC-7.2-c GPC-7.3-c |
| B1.O.01.02 | Foreign language for professional communication | | | | | | | |
| B1.O.01.03 | Regulation System in Construction | | | | GPC-4.1-c GPC-4.2-c GPC-4.3-c | | | |
| B1.O.01.04 | Mathematical modeling | GPC-1.1-c GPC-1.2-c GPC-1.3-c | GPC-2.1-c GPC-2.2-c GPC-2.3-c | | | | | |
| B1.O.01.05 | Organization and management in construction | | | GPC-3.1-c GPC-3.2-c GPC-3.3-c | GPC-4.1-c GPC-4.2-c GPC-4.3-c | | | GPC-7.1-c GPC-7.2-c GPC-7.3-c |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|----------------|--|---|---|---|---|---|--|-------------------------------------|
| | | GPC-1-c able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences. | GPC-2-c able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including through | GPC-3-c able to set and solve scientific and technical problems in the field of construction, the construction industry and housing and communal services based on knowledge of the problems of the industry and experience in solving them | GPC-4 -c able to use and develop design, administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services | GPC-5-c able to conduct and organize design and survey work in the field of construction and housing and communal services, carry out technical expertise of projects and supervision of their compliance | GPC-6-c capable of carrying out research of objects and processes in the field of construction and housing and communal services | |
| B1.O.01.06 | Digital technologies in Civil Engineering | GPC-1.1-c GPC-1.2-c GPC-1.3-c | GPC-2.1-c GPC-2.2-c GPC-2.3-c | | | | | |
| B1.O.01.07 | Environmental rationing | | | | | | | |
| B1.O.02 | Variable component | | | | | | | |
| B1.O.02.01 | Fundamentals of scientific research | GPC-1.1-c GPC-1.2-c GPC-1.3-c | | | | | GPC-6.1-c GPC-6.2-c GPC-6.3-c | |
| B1.O.02.02 | Urban water management and climate change adaptation | | | | | | | |
| B1.O.02.03 | Sustainable development of urban areas | | | | | | | GPC-7.1-c GPC-7.2-c GPC-7.3-c |
| B1.O.02.04 | Project management | | | | | | | |
| B1.O.02.05 | Theoretical foundations and design methods of pipeline systems for water supply and sanitation | GPC-1.1-c GPC-1.2-c GPC-1.3-c | | GPC-3.1-c GPC-3.2-c GPC-3.3-c | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|---------------|---|---|---|---|---|---|--|--|
| | | GPC-1-c able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences. | GPC-2-c able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including through | GPC-3-c able to set and solve scientific and technical problems in the field of construction, the construction industry and housing and communal services based on knowledge of the problems of the industry and experience in solving them | GPC-4 -c able to use and develop design, administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services | GPC-5-c able to conduct and organize design and survey work in the field of construction and housing and communal services, carry out technical expertise of projects and supervision of their compliance | GPC-6-c capable of carrying out research of objects and processes in the field of construction and housing and communal services | GPC-7-c able to manage an organization operating in the construction industry and housing and communal services, organize and optimize its production activities |
| B1.O.02.06 | Management of operation of water supply and sanitation systems | | GPC-2.1-c GPC-2.2-c GPC-2.3-c | | | | | |
| B1.O.02.07 | Regional and municipal waste management systems | | | | | | | |
| B1.O.02.08 | Urban development and environmental engineering surveys | | | | | | | |
| B1.O.02.09 | Regional geocology and urban ecology | | | | | GPC-5.1-c GPC-5.2-c GPC-5.3-c | | |
| B1.O.02.10 | Dynamics of environmental systems | | GPC-2.1-c GPC-2.2-c GPC-2.3-c | | | | | |
| B1.B | The part formed by the participants of educational relations | | | | | | | |
| B1.B.DB.01.01 | Natural water conditioning systems | | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|---------------|---|---|---|---|---|---|--|--|
| | | GPC-1-c able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences. | GPC-2-c able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including through | GPC-3-c able to set and solve scientific and technical problems in the field of construction, the construction industry and housing and communal services based on knowledge of the problems of the industry and experience in solving them | GPC-4 -c able to use and develop design, administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services | GPC-5-c able to conduct and organize design and survey work in the field of construction and housing and communal services, carry out technical expertise of projects and supervision of their compliance | GPC-6-c capable of carrying out research of objects and processes in the field of construction and housing and communal services | GPC-7-c able to manage an organization operating in the construction industry and housing and communal services, organize and optimize its production activities |
| B1.B.DB.01.02 | Assessments of water bodies environment of urban areas | | | | | | | |
| B1.B.DB.02.01 | Green areas and protected areas in the city | | | | | | | |
| B1.B.DB.02.02 | Blue -green urban infrastructure | | | | | | | |
| B1.B.DB.03.01 | Urban Ecosystems | | | | | | | |
| B1.B.DB.03.02 | Environmental control and monitoring of urban environment | | | | | | | |
| B1.B.DB.04.01 | Hydrological Modelling | | | | | | | |
| B1.B.DB.04.02 | Modeling of water supply and wastewater disposal systems | | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|----------------|---|---|---|---|---|---|--|--|
| | | GPC-1-c able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences. | GPC-2-c able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including through | GPC-3-c able to set and solve scientific and technical problems in the field of construction, the construction industry and housing and communal services based on knowledge of the problems of the industry and experience in solving them | GPC-4 -c able to use and develop design, administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services | GPC-5-c able to conduct and organize design and survey work in the field of construction and housing and communal services, carry out technical expertise of projects and supervision of their compliance | GPC-6-c capable of carrying out research of objects and processes in the field of construction and housing and communal services | GPC-7-c able to manage an organization operating in the construction industry and housing and communal services, organize and optimize its production activities |
| B1.B.DB.05.01 | Life cycle analysis of construction object | | | | | | | |
| B1.B.DB.05.02 | Social adaptation of persons with disabilities in the conditions of professional activity | | | | | | | |
| B2 | PRACTICE | | | | | | | |
| B2.O | Mandatory part | | | | | | | |
| B2.O.01 | Core component | | | | | | | |
| B2.O.01 | Educational practice, introductory | | GPC-2.1-c GPC-2.2-c GPC-2.3-c | GPC-3.1-c GPC-3.2-c GPC-3.3-c | | | | |
| B2.O.02 | Industry practice, performing | | | | GPC-4.1-c GPC-4.2-c GPC-4.3-c | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|--------------|---|---|---|---|---|---|--|--|
| | | GPC-1-c able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences. | GPC-2-c able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including through | GPC-3-c able to set and solve scientific and technical problems in the field of construction, the construction industry and housing and communal services based on knowledge of the problems of the industry and experience in solving them | GPC-4 -c able to use and develop design, administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services | GPC-5-c able to conduct and organize design and survey work in the field of construction and housing and communal services, carry out technical expertise of projects and supervision of their compliance | GPC-6-c capable of carrying out research of objects and processes in the field of construction and housing and communal services | GPC-7-c able to manage an organization operating in the construction industry and housing and communal services, organize and optimize its production activities |
| B2.B | The part formed by the participants of educational relations | | | | | | | |
| B2.B.01 | Applied scientific research | GPC-1.1-c GPC-1.2-c GPC-1.3-c | GPC-2.1-c GPC-2.2-c GPC-2.3-c | | | | GPC-6.1-c GPC-6.2-c GPC-6.3-c | |
| B2.B.02 | Industrial practice, pre -diploma | GPC-1.1-c GPC-1.2-c GPC-1.3-c | | | | | GPC-6.1-c GPC-6.2-c GPC-6.3-c | |
| B3 | Final State Examination | | | | | | | |
| B3.O.01 | State Exam | GPC-1.1-c GPC-1.2-c GPC-1.3-c | GPC-2.1-c GPC-2.2-c GPC-2.3-c | GPC-3.1-c GPC-3.2-c GPC-3.3-c | GPC-4.1-c GPC-4.2-c GPC-4.3-c | GPC-5.1-c GPC-5.2-c GPC-5.3-c | GPC-6.1-c GPC-6.2-c GPC-6.3-c | GPC-7.1-c GPC-7.2-c GPC-7.3-c |
| B3.O.02 | Degree Diploma | GPC-1.1-c GPC-1.2-c GPC-1.3-c | GPC-2.1-c GPC-2.2-c GPC-2.3-c | GPC-3.1-c GPC-3.2-c GPC-3.3-c | GPC-4.1-c GPC-4.2-c GPC-4.3-c | GPC-5.1-c GPC-5.2-c GPC-5.3-c | GPC-6.1-c GPC-6.2-c GPC-6.3-c | GPC-7.1-c GPC-7.2-c GPC-7.3-c |
| OD | Optional Disciplines | | | | | | | |
| OD.01 | Foreign language | | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|-------|--|---|---|---|---|---|--|--|
| | | GPC-1-c able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences. | GPC-2-c able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including through | GPC-3-c able to set and solve scientific and technical problems in the field of construction, the construction industry and housing and communal services based on knowledge of the problems of the industry and experience in solving them | GPC-4 -c able to use and develop design, administrative documentation, as well as participate in the development of regulatory legal acts in the field of the construction industry and housing and communal services | GPC-5-c able to conduct and organize design and survey work in the field of construction and housing and communal services, carry out technical expertise of projects and supervision of their compliance | GPC-6-c capable of carrying out research of objects and processes in the field of construction and housing and communal services | GPC-7-c able to manage an organization operating in the construction industry and housing and communal services, organize and optimize its production activities |
| OD.02 | Information modeling technologies for energy-saving construction | | | | | | | |
| OD.03 | Programming technologies Python | | | | | | | |
| OD.04 | Information databases | | | | | | | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | | |
|-----------------|---|---|--|---|---|---|--|
| | | PC-1 able to carry out an expert examination of design solutions for industrial and civil construction facilities, including in the field of environmental management | PC-2 able to diagnose environmental protection problems, develop standard environmental protection measures and practical recommendations for ensuring sustainable development and assess the impact of planned structures or other forms of economic activity on the environment. | PC-3 able to carry out and organize scientific research of industrial and civil construction facilities, including in the field of environmental management | PC-4 capable of developing design solutions and measures to ensure the safety of industrial and civil construction facilities | PC-5 able to develop design solutions and organize design in the field of industrial and civil construction | |
| Block 1. | Disciplines (modules) | | | | | | |
| B1.O | Mandatory part | | | | | | |
| B1.O.01 | Core component | | | | | | |
| B1.O.01.01 | Leadership and Team management | | | | | | |
| B1.O.01.02 | Foreign language for professional communication | | | | | | |
| B1.O.01.03 | Regulation System in Construction | | | | | | |
| B1.O.01.04 | Mathematical modeling | | | | | | |
| B1.O.01.05 | Organization and management in construction | PC-1.1 PC-1.2 | | | | PC-5.1 PC-5.2 PC-5.3 | |
| B1.O.01.06 | Digital technologies in Civil Engineering | | | | | | |
| B1.O.01.07 | Environmental rationing | | | | PC-4.1 PC-4.2 PC-4.3 | | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | | |
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| | | PC-1 able to carry out an expert examination of design solutions for industrial and civil construction facilities, including in the field of environmental management | PC-2 able to diagnose environmental protection problems, develop standard environmental protection measures and practical recommendations for ensuring sustainable development and assess the impact of planned structures or other forms of economic activity on the environment. | PC-3 able to carry out and organize scientific research of industrial and civil construction facilities, including in the field of environmental management | PC-4 capable of developing design solutions and measures to ensure the safety of industrial and civil construction facilities | PC-5 able to develop design solutions and organize design in the field of industrial and civil construction | |
| B1.O.02 | Variable component | | | | | | |
| B1.O.02.01 | Fundamentals of scientific research | | | PC-3.1 PC-3.2 PC-3.3 | | | |
| B1.O.02.02 | Urban water management and climate change adaptation | | PC-2.1 PC-2.2 PC-2.3 | | | | |
| B1.O.02.03 | Sustainable development of urban areas | | PC-2.1 PC-2.2 PC-2.3 | | | | |
| B1.O.02.04 | Project management | PC-1.1 PC-1.2 | | PC-3.1 PC-3.2 PC-3.3 | PC-4.1 PC-4.2 PC-4.3 | | |
| B1.O.02.05 | Theoretical foundations and design methods of pipeline systems for water supply and sanitation | | | PC-3.1 PC-3.2 PC-3.3 | PC-4.1 PC-4.2 PC-4.3 | PC-5.1 PC-5.2 PC-5.3 | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | | | |
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| B1.O.02.06 | Management of operation of water supply and sanitation systems | PC-1.1 PC-1.2 | | | | PC-5.1 PC-5.2 PC-5.3 | | |
| B1.O.02.07 | Regional and municipal waste management systems | | | | PC-4.1 PC-4.2 PC-4.3 | | | |
| B1.O.02.08 | Urban development and environmental engineering surveys | | PC-2.1 PC-2.2 PC-2.3 | PC-3.1 PC-3.2 PC-3.3 | | | | |
| B1.O.02.09 | Regional geocology and urban ecology | | PC-2.1 PC-2.2 PC-2.3 | PC-3.1 PC-3.2 PC-3.3 | | | | |
| B1.O.02.10 | Dynamics of environmental systems | | | | PC-4.1 PC-4.2 PC-4.3 | | | |
| B1.B | The part formed by the participants of educational relations | | | | | | | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | | | |
|---------------|---|---|--|---|---|---|--|--|
| | | PC-1 able to carry out an expert examination of design solutions for industrial and civil construction facilities, including in the field of environmental management | PC-2 able to diagnose environmental protection problems, develop standard environmental protection measures and practical recommendations for ensuring sustainable development and assess the impact of planned structures or other forms of economic activity on the environment. | PC-3 able to carry out and organize scientific research of industrial and civil construction facilities, including in the field of environmental management | PC-4 capable of developing design solutions and measures to ensure the safety of industrial and civil construction facilities | PC-5 able to develop design solutions and organize design in the field of industrial and civil construction | | |
| B1.B.DB.01.01 | Natural water conditioning systems | | | | | PC-5.1 PC-5.2 PC-5.3 | | |
| B1.B.DB.01.02 | Assessments of water bodies environment of urban areas | | PC-2.1 PC-2.2 PC-2.3 | | | | | |
| B1.B.DB.02.01 | Green areas and protected areas in the city | | PC-2.1 PC-2.2 PC-2.3 | PC-3.1 PC-3.2 PC-3.3 | | | | |
| B1.B.DB.02.02 | Blue -green urban infrastructure | | PC-2.1 PC-2.2 PC-2.3 | PC-3.1 PC-3.2 PC-3.3 | | | | |
| B1.B.DB.03.01 | Urban Ecosystems | | PC-2.1 PC-2.2 PC-2.3 | | | | | |
| B1.B.DB.03.02 | Environmental control and monitoring of urban environment | | PC-2.1 PC-2.2 | | | | | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | | |
|---------------|---|---|--|---|---|---|--|
| | | PC-1 able to carry out an expert examination of design solutions for industrial and civil construction facilities, including in the field of environmental management | PC-2 able to diagnose environmental protection problems, develop standard environmental protection measures and practical recommendations for ensuring sustainable development and assess the impact of planned structures or other forms of economic activity on the environment. | PC-3 able to carry out and organize scientific research of industrial and civil construction facilities, including in the field of environmental management | PC-4 capable of developing design solutions and measures to ensure the safety of industrial and civil construction facilities | PC-5 able to develop design solutions and organize design in the field of industrial and civil construction | |
| | | | PC-2.3 | | | | |
| B1.B.DB.04.01 | Hydrological Modelling | PC-1.1 PC-1.2 | | | | PC-5.1 PC-5.2 PC-5.3 | |
| B1.B.DB.04.02 | Modeling of water supply and wastewater disposal systems | PC-1.1 PC-1.2 | | | | PC-5.1 PC-5.2 PC-5.3 | |
| B1.B.DB.05.01 | Life cycle analysis of construction object | PC-1.1 PC-1.2 | | PC-3.1 PC-3.2 PC-3.3 | | PC-5.1 PC-5.2 PC-5.3 | |
| B1.B.DB.05.02 | Social adaptation of persons with disabilities in the conditions of professional activity | | | PC-3.1 PC-3.2 PC-3.3 | | PC-5.1 PC-5.2 PC-5.3 | |
| B2 | PRACTICE | | | | | | |
| B2.O | Mandatory part | | | | | | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | | |
|----------------|---|---|--|---|---|---|--|
| | | PC-1 able to carry out an expert examination of design solutions for industrial and civil construction facilities, including in the field of environmental management | PC-2 able to diagnose environmental protection problems, develop standard environmental protection measures and practical recommendations for ensuring sustainable development and assess the impact of planned structures or other forms of economic activity on the environment. | PC-3 able to carry out and organize scientific research of industrial and civil construction facilities, including in the field of environmental management | PC-4 capable of developing design solutions and measures to ensure the safety of industrial and civil construction facilities | PC-5 able to develop design solutions and organize design in the field of industrial and civil construction | |
| B2.O.01 | Core component | | | | | | |
| B2.O.01 | Educational practice, introductory | | PC-2.1 PC-2.2 PC-2.3 | | | | |
| B2.O.02 | Industry practice, performing | | PC-2.1 PC-2.2 PC-2.3 | | | PC-5.1 PC-5.2 PC-5.3 | |
| B2.B | The part formed by the participants of educational relations | | | | | | |
| B2.B.01 | Applied scientific research | | PC-2.1 PC-2.2 PC-2.3 | PC-3.1 PC-3.2 PC-3.3 | PC-4.1 PC-4.2 PC-4.3 | | |
| B2.B.02 | Industrial practice, pre -diploma | | PC-2.1 PC-2.2 PC-2.3 | | PC-4.1 PC-4.2 PC-4.3 | | |
| B3 | Final State Examination | | | | | | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | | | |
|--------------|--|---|--|---|---|---|--|--|
| | | PC-1 able to carry out an expert examination of design solutions for industrial and civil construction facilities, including in the field of environmental management | PC-2 able to diagnose environmental protection problems, develop standard environmental protection measures and practical recommendations for ensuring sustainable development and assess the impact of planned structures or other forms of economic activity on the environment. | PC-3 able to carry out and organize scientific research of industrial and civil construction facilities, including in the field of environmental management | PC-4 capable of developing design solutions and measures to ensure the safety of industrial and civil construction facilities | PC-5 able to develop design solutions and organize design in the field of industrial and civil construction | | |
| B3.O.01 | State Exam | PC-1.1 PC-1.2 | PC-2.1 PC-2.2 PC-2.3 | PC-3.1 PC-3.2 PC-3.3 | PC-4.1 PC-4.2 PC-4.3 | PC-5.1 PC-5.2 PC-5.3 | | |
| B3.O.02 | Degree Diploma | PC-1.1 PC-1.2 | PC-2.1 PC-2.2 PC-2.3 | PC-3.1 PC-3.2 PC-3.3 | PC-4.1 PC-4.2 PC-4.3 | PC-5.1 PC-5.2 PC-5.3 | | |
| OD | Optional Disciplines | | | | | | | |
| OD.01 | Foreign language | | | | | | | |
| OD.02 | Information modeling technologies for energy-saving construction | | | | | PC-5.1 PC-5.2 PC-5.3 | | |
| OD.03 | Programming technologies Python | | | | | | | |
| OD.04 | Information databases | | | | | | | |