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**Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
RUDN University**

Academy of Engineering

educational division (faculty/institute/academy) as higher education programme developer

Approved at the meeting of the Academic
Council of RUDN University

Opened by order of the Rector of
RUDN University No. 888

Protocol No. 12

September 24, 2018

(date, month, year)

November 13, 2018

(date, month, year)

PROFESSIONAL EDUCATION PROGRAMME OF HIGHER EDUCATION

Field of Studies/ Speciality:

08.04.01 Civil Engineering

field of studies / speciality code and title

Profile/Specialisation:

Civil Engineering and Built Environment

higher education programme title

The Educational Programme is developed in compliance with:

Educational Standard of RUDN University, approved by Order of the Rector No. 371

dated 21.05.2021

(day, month, year)

Level of education:

master's

(bachelor's / specialist's / master's – to fill in the required)

Graduate's Qualification:

Master

(graduate's qualification in compliance with the order of the Ministry of Education and Science of Russian Federation dated September 12, 2013, No. 1061)

Length of Educational Programme:

2 years

(full-time education)

(part-time education)

(correspondence education)

AGREED by:

Head
of Educational Programme

M.I. Rynkovskaya

(signature)

(day, month, year)

Chairperson
of Didactic Council

S.B. Yazyev

(signature)

(day, month, year)

Head
of Educational
Department
Yu.N. Razoumny

(signature)

(day, month, year)

1. EDUCATIONAL PROGRAMME GOAL (MISSION)

Master's program Civil Engineering and Built Environment is focused on training of high-class specialists in the field of construction. The educational program is designed in such a way that allows students to form both universal and professional competencies required by the educational standard and the most popular professional competencies of today's industry. In the process of education students receive theoretical training, practical skills, as well as the skills of research and scientific-pedagogical work. This allows them after graduation from the educational program to work effectively at the enterprises of the construction complex in managerial positions, as well as in research organizations.

2. EDUCATIONAL PROGRAMME RELEVANCE, SPECIFICITY, AND UNIQUENESS

The educational program is updated annually in order to take into account the needs of the construction complex in specialists with the most sought-after competencies of the industry. The program includes new disciplines in order to acquaint future professionals with new directions, innovations, promising developments, which are already being implemented, or will be in demand in the construction industry in the coming years.

In the course of this program, students have the opportunity to choose the most interesting educational trajectories and to change them if necessary. In addition to the main subjects, students have the opportunity to study elective disciplines that expand and deepen their professional competencies. In the course of training students are encouraged to do term papers, graduation works, projects on topics chosen by students. All this makes it possible to take into account the individual interests of students, increase their involvement in the educational process, and, as a result, increase the effectiveness of their training. In addition, it makes it possible to train multidisciplinary specialists with versatile professional competencies.

Interactive technologies such as business games, case studies, interdisciplinary projects, practices and internships at leading enterprises of the construction complex are actively used in the learning process.

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

The main potential employers of graduates of the educational program:

- design firms,
- construction companies,
- organizations that have subdivisions engaged in design or construction work.
- research centers dealing with the problems of the complex construction,
- higher educational institutions that train specialists in construction.

5. SPECIAL REQUIREMENTS FOR POTENTIAL APPLICANTS

The master's program is designed for applicants who already have a degree in higher education (bachelor's or specialist's degree), have basic knowledge in the field of construction, and wish to expand their competencies in this area.

Basic knowledge in the field of construction is tested during the entrance tests in the form of an interdisciplinary examination, which is held in accordance with the rules of admission to the University in the field of 08.04.01 "Civil Engineering", posted on the website of RUDN University.

6. FEATURES OF EDUCATIONAL PROGRAMME IMPLEMENTATION

6.1. The Educational Programme is implemented without the use of distance learning technologies, using elements of e-learning with the help of the RUDN TUIS system.

6.2. The language of the Educational Programme implementation is English.

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

6.4. The Educational Programme is implemented by the Federal State Autonomous Educational Institution of Higher Education "Peoples' Friendship University of Russia named after Patrice Lumumba".

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

| Internship | Internship location |
|--|--|
| Introductory practices (introductory, intramural / extramural) | JSC "31 State Design Institute of Special Construction", Moscow; LLC "Gidrospetsproekt", Moscow; |

| Internship | Internship location |
|---|---|
| Design Practice (advanced field internship, intramural / extramural) | JSC "Design and Technological Bureau of Concrete and Reinforced Concrete", Moscow; JSC "SIC "Construction", Moscow; |
| Technological practice (advanced field internship, intramural / extramural) | CJSC "SIC Stadium", Moscow; Prokon Software Consultants (Pty) LTD, Moscow; ZET-PROJECT LLC, Moscow; |
| Pedagogical practice (introductory, intramural / extramural) | Inteco JSC, Moscow; JSC "VCI", Moscow; RERUM GROUP JSC, Moscow; |
| Independent Research Work (obtaining basic skills of research work) (introductory, intramural / extramural) | Department of Construction of the PFUR Engineering Academy, as well as other organizations: –organizations (enterprises) for the construction, installation, repair and reconstruction of buildings, structures, their parts and individual structures (specialized organizations); |
| Independent Research Work (advanced field internship, intramural / extramural) | –research, design and development institutions and firms; –companies for the production of building structures and products, the introduction of experimental materials and technologies for construction; |
| Pre-Graduation Practice (advanced field internship, intramural / extramural) | –construction laboratories, quality and certification centers, customer and supervisory services, etc. |

7. CHARACTERISTICS OF EDUCATIONAL PROGRAMME GRADUATE'S PROFESSIONAL ACTIVITIES

7.1. The field(s) of professional activities of the Educational Programme graduate, where he/she can carry out his/her professional activities:

10 Architecture, engineering, geodesy, topography, and design

16 Construction and housing and communal services

7.2. The type(s) of professional activities tasks, which the graduate is trained to solve when mastering the Educational Programme:

- research;
- design;
- technological;
- pedagogical;
- organizational and managerial;
- service and maintenance.

8. REQUIREMENTS FOR EDUCATIONAL PROGRAMME OUTCOMES

8.1. 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 critically analyze problem situations on the basis of a systematic approach, to develop a strategy of action | GC-1.1 Analyzes the problem, identifying its basic components |
| | GC-1.2 Identifies and ranks the information required to solve the task |
| | GC-1.3 Selects ways to solve the problem, analyzes the possible consequences of their use |
| GC-2 Able to manage the project at all stages of its life cycle | GC-2.1 Formulates the goals and objectives of the project, determines the expected results |
| | GC-2.2 Within the scope of the tasks, identifies the available resources and limitations |
| | GC-2.3 Develops a project implementation schedule |
| | GC-2.4 Monitors the progress of the project, adjusts the schedule in accordance with the results of the control, evaluates the performance of the project |
| GC-3 Able to organize and lead a team, developing a team strategy to achieve the goal | GC-3.1 Knows how to organize teamwork, develop a strategy to achieve the goal |
| | GC-3.2 Able to monitor the progress of teamwork and adjust its work for the effective achievement of goals |
| GC-4 Able to use modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction | GC-4.1 Carries out academic and professional interaction in Russian and foreign languages |
| | GC-4.2 Uses modern information and communication technologies to search for information and solve standard communication tasks in Russian and foreign languages |
| | GC-4.3 Able to present materials of academic and professional activities at public events |
| GC-5 Able to analyze and take into account the diversity of cultures in the process of intercultural interaction | GC-5.1 Shows an understanding of the characteristics of different cultures |
| | GC-5.2 Builds social interaction in personal and mass communication in order to fulfill professional tasks, taking into account the peculiarities of ethnic groups and faiths, philosophical and ethical teachings |
| GC-6 Able to identify and implement the priorities of their own activities and ways to improve them on the basis of self-assessment | GC-6.1 Analyzes tasks, projects, and their goals. Defines its resources and their limits (personal, situational, temporary, etc.) for the successful completion of the task |
| | GC-6.2 Prioritize and choose the appropriate tools and methods for achieving goals and managing time |
| GC-7 Able: to search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as using algorithms when working with data received from various sources to effectively use the information to solve problems ; to assess information, its reliability, to build logical conclusions on the basis of incoming information and data | GC-7.1 Searches for relevant sources of information and data, perceives, analyzes, remembers and transmits information using digital tools and algorithms when working with data from various sources in order to effectively use the information to solve problems |
| | GC-7.2 Evaluates information, its reliability, builds logical conclusions on the basis of incoming information and data |

8.2. 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 solve problems of professional activity on the basis of theoretical and practical foundations, the mathematical apparatus of the fundamental sciences | GPC-1.1 Selects a mathematical model suitable for the professional problem to be solved, sets the required parameters and boundary conditions |
| | GPC-1.2 Solves mathematical modeling problems using suitable analytical, numerical, or numerical-analytical methods |
| | GPC-1.3 Solves professional problems using modern software systems for mathematical, digital modeling of structures |
| GPC-2 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 Able to search for scientific and technical information, including with the help of information technology |
| | GPC-2.2 Able to analyze, critically comprehend information, acquire new knowledge |
| | GPC-2.3 Able to present found and meaningful information, including with the help of information technology |
| GPC-3 Able to set and solve scientific and technical problems in the field of construction, construction industry and housing and communal services on the basis of knowledge of industry problems and experience in their solution | GPC-3.1 Able to formulate and solve scientific and technical tasks in the field of building structures design |
| | GPC-3.2 Able to set and solve scientific and technical tasks in the field of technology, organization, management of construction and operation of capital construction projects |
| | GPC-3.3 Able to formulate and solve scientific and technical tasks in the field of engineering systems design |
| GPC-4 Able to use and develop project and administrative documentation, as well as participate in the development of normative legal acts in the field of construction and housing and communal services | GPC-4.1 Able to use and develop project documentation |
| | GPC-4.2 Able to use and develop administrative documentation |
| | GPC-4.3 Able to use normative legal acts in the field of construction industry and housing and communal services, as well as to participate in their development |
| GPC-5 Able to conduct and organize design and survey work in the field of construction, housing and communal services, carry out technical expertise of projects and designer's supervision of their compliance | GPC-5.1 Able to conduct and organize survey work in the field of construction and housing and communal services |
| | GPC-5.2 Capable of conducting and organizing technical expertise of projects and author's supervision of their observance |
| GPC-6 Able to carry out research of objects and processes in the field of construction and housing and | GPC-6.1 Able to formulate goals, set research objectives, develop a research program |
| | GPC-6.2 Able to choose appropriate research methods and carry out research according to the chosen methodology |

| Code and descriptor of general professional competence | Code and competence level indicator |
|---|---|
| communal services | GPC-6.3 Capable of processing, analyzing and drawing up research results |
| | GPC-6.4 Able to present and defend the results of the research |
| GPC-7 Able to manage an organization operating in the construction industry and housing and communal services, to organize and optimize its production activities | GPC-7.1 Capable of planning and organizing work in the field of design, construction, operation of capital construction projects |
| | GPC-7.2 Has knowledge in the field of operational management, management of works in the field of design, construction, operation of capital construction objects |
| | GPC-7.3 Capable of controlling and accepting work in the design, construction and operation of capital construction projects |
| | GPC-7.4 Knows the order of interaction with the customer, the delivery of completed work in the design, construction, operation of capital construction objects |
| | GPC-7.5 Able to develop measures to improve the efficiency of work in the design, construction, operation of capital construction projects |

8.3. 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 |
|--|---|--|
| PC-1 Conducting scientific research in the field of construction | PC-1.1 Able to carry out planning, preparation for research | PC-1 Carrying out applied research in the field of engineering design for urban planning activities |
| | PC-1.2 Able to carry out, control, receive research results | |
| | PC-1.3 Able to analyze and process research results | |
| | PC-1.4 Knows how to draw up, coordinate, and present the results of completed research | |
| PC-2 Development of project products based on the results of engineering and technical design for urban development activities | PC-2.1 Capable of performing engineering and technical design and developing design products for building structures, grounds and foundations | PC-2 Development of design products based on the results of engineering design for urban planning activities |
| | PC-2.2 Able to perform engineering and technical design and develop design products for engineering systems and engineering structures | |
| | PC-2.3 Is able to perform organizational and technological design and develop construction organization projects and work production projects | |
| PC-3 Organizational, technical and technological preparation of construction production | PC-3.1 Able to carry out scheduling of construction works | PC-3 Organizational and pedagogical support of students |
| | PC-3.2 Knows how to choose the required material, labor resources and construction equipment for the production of works | |
| | PC-3.3 Knows how to choose suitable techniques, methods of work | |
| | PC-3.4 Able to plan control over the production of construction works, including compliance with safety during the production of works | |
| | PC-3.5 Able to develop organizational and technological documentation | |

| Code and descriptor of professional competence | Code and competence level indicator | Code and title of occupational standard for relevant PC |
|---|--|--|
| PC-4 Organizational and pedagogical support of students | PC-4.1 Able to carry out the development of educational and methodological documentation under the guidance of an experienced teacher | PC-4 Management of the complex of works on operation and repair of civil buildings |
| | PC-4.2 Able to prepare for classes with students or monitor the knowledge of students | |
| | PC-4.3 Able to perform teaching activities according to specialized basic educational programs or additional education programs under the guidance of an experienced teacher | |
| PC-5 Organization of construction works at the capital construction facility | PC-5.1 Knows how to determine the required resources to perform the work | PC-5 Organization of construction works on the object of capital construction |
| | PC-5.2 Able to carry out scheduling of works | |
| | PC-5.3 Able to identify and take into account regulatory, legislative requirements, project requirements and organizational and technological documentation for the production of construction works | |
| | PC-5.4 Capable of performing operational management, monitoring the progress of work | |
| | PC-5.5 Able to carry out technical control, supervision, acceptance of construction works | |

9. MATRIX OF COMPETENCES that students acquire when mastering the Educational Programme Civil Engineering and Built Environment, in the field of studies 08.04.01 Civil Engineering

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | |
|----------------|--|---|---|---|--|--|---|---|
| | | GC-1 Able to critically analyze problem situations on the basis of a systematic approach, to develop a strategy of action | GC-2 Able to manage the project at all stages of its life cycle | GC-3 Able to organize and lead a team, developing a team strategy to achieve the goal | GC-4 Able to use 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 their own activities and ways to improve them on the basis of self-assessment | GC-7 Able: to search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as using algorithms when working with data received from various sources to effectively use the information to solve problems; to assess information, its reliability, to build logical conclusions on the basis of incoming information and data |
| B1 | Disciplines (modules) | | | | | | | |
| B1.O | Obligatory part | | | | | | | |
| B1.O.01 | Base component | GC-1.1, GC-1.2, GC-1.3 | GC-2.1 | GC-3.1 | GC-4.1, GC-4.2, GC-4.3 | GC-5.1, GC-5.2 | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B1.O.01.01 | Professional Russian (as a Foreign Language) | | | | GC-4.3 | GC-5.1, GC-5.2 | | |
| B1.O.01.02 | Problem solving techniques in Civil Engineering | GC-1.1, GC-1.2, GC-1.3 | GC-2.1 | GC-3.1 | GC-4.2, GC-4.3 | | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B1.O.02 | Variable component | GC-1.1, GC-1.2, GC-1.3 | GC-2.1, GC-2.2, GC-2.3, GC-2.4 | GC-3.1, GC-3.2 | | | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B1.O.02.01 | Mathematical methods of experimental data processing | GC-1.1, GC-1.3 | | | | | | GC-7.1, GC-7.2 |
| B1.O.02.02 | Numerical methods for Civil Engineering | GC-1.1, GC-1.2, GC-1.3 | | | | | | |
| B1.O.02.03 | Mathematical Modelling | GC-1.1, GC-1.2, GC-1.3 | | | | | | |
| B1.O.02.04 | Digital technologies in construction | | | | | | | GC-7.1, GC-7.2 |
| B1.O.02.05 | Project management | | GC-2.1, GC-2.2, GC-2.3, GC-2.4 | GC-3.1, GC-3.2 | | | GC-6.1 | |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | |
|-------------------|---|---|---|---|--|--|---|--|
| | | GC-1 Able to critically analyze problem situations on the basis of a systematic approach, to develop a strategy of action | GC-2 Able to manage the project at all stages of its life cycle | GC-3 Able to organize and lead a team, developing a team strategy to achieve the goal | GC-4 Able to use 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 their own activities and ways to improve them on the basis of self-assessment | GC-7 Able: to search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as using algorithms when working with data received from various sources to effectively use the information to solve problems ; to assess information, its reliability, to build logical conclusions on the basis of incoming information and data |
| B1.O.02.06 | Geoinformation Systems and Applications | GC-1.1, GC-1.2, GC-1.3 | | | | | | GC-7.1, GC-7.2 |
| B1.O.02.07 | Life Cycle Economics of Buildings | | GC-2.1, GC-2.2, GC-2.4 | | | | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B1.O.02.08 | BIM-Technology in Construction Management | | GC-2.1 | | | | | GC-7.1, GC-7.2 |
| B1.V | Part formed by participants in educational relations | | | | | | | |
| B1.V.EC.01 | Elective Module | | | | | | | |
| B1.V.EC.01.01 | Structural Design in Steel | | | | | | | |
| B1.V.EC.01.02 | Nanotechnology in Civil Engineering | | | | | | | |
| B1.V.EC.02 | Elective Module | | | | | | | |
| B1.V.EC.02.01 | Structural Design in Reinforced Concrete | | | | | | | |
| B1.V.EC.02.02 | Building materials: Special Topics | | | | | | | |
| B1.V.EC.03 | Elective Module | | | | | | | |
| B1.V.EC.03.01 | Structural Design in Reinforced Concrete: Special Topics | | | | | | | |
| B1.V.EC.03.02 | Structural Dynamics | | | | | | | |
| B1.V.EC.04 | Elective Module | | | | | | | |
| B1.V.EC.04.01 | Structural Design in Steel: Special Topics | | | | | | | |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | |
|-------------------|--|---|---|---|--|--|---|--|
| | | GC-1 Able to critically analyze problem situations on the basis of a systematic approach, to develop a strategy of action | GC-2 Able to manage the project at all stages of its life cycle | GC-3 Able to organize and lead a team, developing a team strategy to achieve the goal | GC-4 Able to use 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 their own activities and ways to improve them on the basis of self-assessment | GC-7 Able: to search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as using algorithms when working with data received from various sources to effectively use the information to solve problems ; to assess information, its reliability, to build logical conclusions on the basis of incoming information and data |
| B1.V.EC.04.02 | Modelling of Construction Processes | | | | | | | |
| B1.V.EC.05 | Elective Module | | | | | | | |
| B1.V.EC.05.01 | Applications of Finite Element Method for Civil Engineering problems | | | | | | | |
| B1.V.EC.05.02 | Sustainability in Civil Engineering | | | | | | | |
| B1.V.EC.06 | Elective Module | | | | | | | |
| B1.V.EC.06.01 | Optimization Methods in Civil Engineering | | | | | | | |
| B1.V.EC.06.02 | Structural Stability | | | | | | | |
| B1.V.EC.06.03 | VR and AR Technologies in Civil Engineering: Special Topics | | | | | | | |
| B1.V.EC.07 | Elective Module | | | | | | | |
| B1.V.EC.07.01 | Geometric Shaping and Analysis of Shells | | | | | | | |
| B1.V.EC.07.02 | Engineering Systems of Buildings | | | | | | | |
| | Practice | GC-1.1, GC-1.2, GC-1.3 | GC-2.1, GC-2.2, GC-2.3, GC-2.4 | GC-3.1, GC-3.2 | GC-4.1, GC-4.2, GC-4.3 | GC-5.1, GC-5.2 | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B2.O | Obligatory part | GC-1.1, GC-1.2, GC-1.3 | GC-2.1, GC-2.2, GC-2.3, GC-2.4 | GC-3.1, GC-3.2 | GC-4.1, GC-4.2, GC-4.3 | GC-5.1, GC-5.2 | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B2.O.01 | Base component | GC-1.1, GC-1.2, GC-1.3 | GC-2.1, GC-2.2, | GC-3.1, GC-3.2 | GC-4.1, GC-4.2, GC-4.3 | GC-5.1, GC-5.2 | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |

| Code | Courses/modules that form students' competences | GENERIC COMPETENCES | | | | | | |
|-----------------|---|---|---|--|--|--|---|--|
| | | GC-1 Able to critically analyze problem situations on the basis of a systematic approach, to develop a strategy of action | GC-2 Able to manage the project at all stages of its life cycle | GC-3 Able to organize and lead a team, developing a strategy to achieve the goal | GC-4 Able to use 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 their own activities and ways to improve them on the basis of self-assessment | GC-7 Able: to search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as using algorithms when working with data received from various sources to effectively use the information to solve problems ; to assess information, its reliability, to build logical conclusions on the basis of incoming information and data |
| | | | GC-2.3, GC-2.4 | | | | | |
| B2.O.01.01(I) | Independent Research Work (obtaining basic skills of research work) | GC-1.1, GC-1.2, GC-1.3 | GC-2.1, GC-2.2, GC-2.3, GC-2.4 | GC-3.1, GC-3.2 | GC-4.3 | | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B2.O.01.02(I) | Pedagogical Practice | | | GC-3.1, GC-3.2 | GC-4.1, GC-4.2, GC-4.3 | GC-5.1, GC-5.2 | | |
| B2.O.01.03(I) | Introductory Practice | GC-1.1, GC-1.2, GC-1.3 | | | | | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B2.O.02 | Variable component | GC-1.1, GC-1.2, GC-1.3 | GC-2.1, GC-2.2, GC-2.3, GC-2.4 | GC-3.1, GC-3.2 | GC-4.3 | | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B2.O.02.01(AFI) | Design Practice | GC-1.1, GC-1.2, GC-1.3 | | | | | | |
| B2.O.02.02(AFI) | Technological Practice | GC-1.1, GC-1.2, GC-1.3 | | | | | | |
| B2.O.02.03(H) | Independent Research Work | GC-1.1, GC-1.2, GC-1.3 | GC-2.1, GC-2.2, GC-2.3, GC-2.4 | GC-3.1, GC-3.2 | GC-4.3 | | GC-6.1, GC-6.2 | GC-7.1, GC-7.2 |
| B2.V | Part formed by participants in educational relations | | | | | | | |
| B2.V.01(PG) | Pre-Graduation Practice | | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|----------------|--|---|---|---|--|---|--|---|
| | | GPC-1 Able to solve problems of professional activity on the basis of theoretical and practical foundations, the mathematical apparatus of the fundamental sciences | GPC-2 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-3 Able to set and solve scientific and technical problems in the field of construction, construction industry and housing and communal services on the basis of knowledge of industry problems and experience in their solution | GPC-4 Able to use and develop project and administrative documentation, as well as participate in the development of normative legal acts in the field of construction and housing and communal services | GPC-5 Able to conduct and organize design and survey work in the field of construction, housing and communal services, carry out technical expertise of projects and designer's supervision of their compliance | GPC-6 Able to carry out research of objects and processes in the field of construction and housing and communal services | GPC-7 Able to manage an organization operating in the construction industry and housing and communal services, to organize and optimize its production activities |
| B1 | Disciplines (modules) | | | | | | | |
| B1.O | Obligatory part | | | | | | | |
| B1.O.01 | Base component | | GPC-2.1, GPC-2.2, GPC-2.3 | | | | GPC-6.1, GPC-6.2, GPC-6.3, GPC-6.4 | GPC-7.5 |
| B1.O.01.01 | Professional Russian (as a Foreign Language) | | | | | | | |
| B1.O.01.02 | Problem solving techniques in Civil Engineering | | GPC-2.1, GPC-2.2, GPC-2.3 | | | | GPC-6.1, GPC-6.2, GPC-6.3, GPC-6.4 | GPC-7.5 |
| B1.O.02 | Variable component | GPC-1.1, GPC-1.2, GPC-1.3 | 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-6.2, GPC-6.3 | GPC-7.1, GPC-7.2, GPC-7.3, GPC-7.4, GPC-7.5 |
| B1.O.02.01 | Mathematical methods of experimental data processing | GPC-1.1, GPC-1.2 | GPC-2.2, GPC-2.3 | | | | GPC-6.2, GPC-6.3 | |
| B1.O.02.02 | Numerical methods for Civil Engineering | GPC-1.1, GPC-1.2, GPC-1.3 | | | | | GPC-6.2, GPC-6.3 | |
| B1.O.02.03 | Mathematical Modelling | GPC-1.1, GPC-1.2, GPC-1.3 | | GPC-3.1 | | | GPC-6.2, GPC-6.3 | |
| B1.O.02.04 | Digital technologies in construction | GPC-1.3 | | GPC-3.1, GPC-3.3 | GPC-4.1, GPC-4.3 | GPC-5.1, GPC-5.2 | | |
| B1.O.02.05 | Project management | | | GPC-3.2 | GPC-4.2, GPC-4.3 | GPC-5.1, GPC-5.2 | | GPC-7.1, GPC-7.2, GPC-7.3, GPC-7.4, GPC-7.5 |
| B1.O.02.06 | Geoinformation Systems and Applications | | | | | | GPC-6.2, GPC-6.3 | |
| B1.O.02.07 | Life Cycle Economics of Buildings | | | | GPC-4.1, GPC-4.2, GPC-4.3 | GPC-5.1, GPC-5.2 | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|-------------------|--|---|---|---|--|---|--|---|
| | | GPC-1 Able to solve problems of professional activity on the basis of theoretical and practical foundations, the mathematical apparatus of the fundamental sciences | GPC-2 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-3 Able to set and solve scientific and technical problems in the field of construction, construction industry and housing and communal services on the basis of knowledge of industry problems and experience in their solution | GPC-4 Able to use and develop project and administrative documentation, as well as participate in the development of normative legal acts in the field of construction and housing and communal services | GPC-5 Able to conduct and organize design and survey work in the field of construction, housing and communal services, carry out technical expertise of projects and designer's supervision of their compliance | GPC-6 Able to carry out research of objects and processes in the field of construction and housing and communal services | GPC-7 Able to manage an organization operating in the construction industry and housing and communal services, to organize and optimize its production activities |
| B1.O.02.08 | BIM-Technology in Construction Management | | | GPC-3.2 | GPC-4.1, GPC-4.2, GPC-4.3 | GPC-5.1, GPC-5.2 | | GPC-7.1, GPC-7.2, GPC-7.3, GPC-7.5 |
| B1.V | Part formed by participants in educational relations | | | | | | | |
| B1.V.EC.01 | Elective Module | | | | | | | |
| B1.V.EC.01.01 | Structural Design in Steel | | | | | | | |
| B1.V.EC.01.02 | Nanotechnology in Civil Engineering | | | | | | | |
| B1.V.EC.02 | Elective Module | | | | | | | |
| B1.V.EC.02.01 | Structural Design in Reinforced Concrete | | | | | | | |
| B1.V.EC.02.02 | Building materials: Special Topics | | | | | | | |
| B1.V.EC.03 | Elective Module | | | | | | | |
| B1.V.EC.03.01 | Structural Design in Reinforced Concrete: Special Topics | | | | | | | |
| B1.V.EC.03.02 | Structural Dynamics | | | | | | | |
| B1.V.EC.04 | Elective Module | | | | | | | |
| B1.V.EC.04.01 | Structural Design in Steel: Special Topics | | | | | | | |
| B1.V.EC.04.02 | Modelling of Construction Processes | | | | | | | |
| B1.V.EC.05 | Elective Module | | | | | | | |
| B1.V.EC.05.01 | Applications of Finite Element Method for Civil Engineering problems | | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|-------------------|---|---|---|---|--|---|--|---|
| | | GPC-1 Able to solve problems of professional activity on the basis of theoretical and practical foundations, the mathematical apparatus of the fundamental sciences | GPC-2 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-3 Able to set and solve scientific and technical problems in the field of construction, construction industry and housing and communal services on the basis of knowledge of industry problems and experience in their solution | GPC-4 Able to use and develop project and administrative documentation, as well as participate in the development of normative legal acts in the field of construction and housing and communal services | GPC-5 Able to conduct and organize design and survey work in the field of construction, housing and communal services, carry out technical expertise of projects and designer's supervision of their compliance | GPC-6 Able to carry out research of objects and processes in the field of construction and housing and communal services | GPC-7 Able to manage an organization operating in the construction industry and housing and communal services, to organize and optimize its production activities |
| B1.V.EC.05.02 | Sustainability in Civil Engineering | | | | | | | |
| B1.V.EC.06 | Elective Module | | | | | | | |
| B1.V.EC.06.01 | Optimization Methods in Civil Engineering | | | | | | | |
| B1.V.EC.06.02 | Structural Stability | | | | | | | |
| B1.V.EC.06.03 | VR and AR Technologies in Civil Engineering: Special Topics | | | | | | | |
| B1.V.EC.07 | Elective Module | | | | | | | |
| B1.V.EC.07.01 | Geometric Shaping and Analysis of Shells | | | | | | | |
| B1.V.EC.07.02 | Engineering Systems of Buildings | | | | | | | |
| | Practice | 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-6.1, GPC-6.2, GPC-6.3, GPC-6.4 | GPC-7.1, GPC-7.2, GPC-7.3, GPC-7.4, GPC-7.5 |
| B2.O | Obligatory part | 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-6.1, GPC-6.2, GPC-6.3, GPC-6.4 | GPC-7.1, GPC-7.2, GPC-7.3, GPC-7.4, GPC-7.5 |
| B2.O.01 | Base component | 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-6.1, GPC-6.2, GPC-6.3, GPC-6.4 | |
| B2.O.01.01(I) | Independent Research Work (obtaining basic skills of research work) | 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-6.1, GPC-6.2, GPC-6.3, GPC-6.4 | |
| B2.O.01.02(I) | Pedagogical Practice | | | | | | | |

| Code | Courses/modules that form students' competences | GENERAL PROFESSIONAL COMPETENCES | | | | | | |
|-----------------|---|---|---|---|--|---|--|---|
| | | GPC-1 Able to solve problems of professional activity on the basis of theoretical and practical foundations, the mathematical apparatus of the fundamental sciences | GPC-2 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-3 Able to set and solve scientific and technical problems in the field of construction, construction industry and housing and communal services on the basis of knowledge of industry problems and experience in their solution | GPC-4 Able to use and develop project and administrative documentation, as well as participate in the development of normative legal acts in the field of construction and housing and communal services | GPC-5 Able to conduct and organize design and survey work in the field of construction, housing and communal services, carry out technical expertise of projects and designer's supervision of their compliance | GPC-6 Able to carry out research of objects and processes in the field of construction and housing and communal services | GPC-7 Able to manage an organization operating in the construction industry and housing and communal services, to organize and optimize its production activities |
| B2.O.01.03(I) | Introductory Practice | | GPC-2.1, GPC-2.2, GPC-2.3 | | | | | |
| B2.O.02 | Variable component | 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-6.1, GPC-6.2, GPC-6.3, GPC-6.4 | GPC-7.1, GPC-7.2, GPC-7.3, GPC-7.4, GPC-7.5 |
| B2.O.02.01(AFI) | Design Practice | GPC-1.3 | | GPC-3.1, GPC-3.3 | GPC-4.1, GPC-4.2, GPC-4.3 | GPC-5.1, GPC-5.2 | | GPC-7.1, GPC-7.2, GPC-7.3, GPC-7.4, GPC-7.5 |
| B2.O.02.02(AFI) | Technological Practice | | | GPC-3.2 | GPC-4.3 | GPC-5.2 | | GPC-7.3, GPC-7.4, GPC-7.5 |
| B2.O.02.03(H) | Independent Research Work | 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-6.1, GPC-6.2, GPC-6.3, GPC-6.4 | |
| B2.V | Part formed by participants in educational relations | | | | | | | |
| B2.V.01(PG) | Pre-Graduation Practice | | | | | | | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | |
|----------------|---|--|--|---|---|--|
| | | PC-1 Conducting scientific research in the field of construction | PC-2 Development of project products based on the results of engineering and technical design for urban development activities | PC-3 Organizational, technical and technological preparation of construction production | PC-4 Organizational and pedagogical support of students | PC-5 Organization of construction works at the capital construction facility |
| B1 | Disciplines (modules) | | | | | |
| B1.O | Obligatory part | | | | | |
| B1.O.01 | Base component | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | | | PC-4.1, PC-4.2, PC-4.3 | |
| B1.O.01.01 | Professional Russian (as a Foreign Language) | | | | | |
| B1.O.01.02 | Problem solving techniques in Civil Engineering | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | | | PC-4.1, PC-4.2, PC-4.3 | |
| B1.O.02 | Variable component | PC-1.3 | PC-2.1, PC-2.2, PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |
| B1.O.02.01 | Mathematical methods of experimental data processing | PC-1.3 | | | | |
| B1.O.02.02 | Numerical methods for Civil Engineering | | | | | |
| B1.O.02.03 | Mathematical Modelling | | | | | |
| B1.O.02.04 | Digital technologies in construction | | PC-2.1, PC-2.2 | | | |
| B1.O.02.05 | Project management | | | PC-3.1, PC-3.2, PC-3.3, PC-3.4 | | PC-5.1, PC-5.2, PC-5.4 |
| B1.O.02.06 | Geoinformation Systems and Applications | | | | | |
| B1.O.02.07 | Life Cycle Economics of Buildings | | PC-2.3 | PC-3.2, PC-3.3 | | PC-5.1 |
| B1.O.02.08 | BIM-Technology in Construction Management | | | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |
| B1.V | Part formed by participants in educational relations | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1, PC-2.2, PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | |
|-------------------|--|--|--|---|---|--|
| | | PC-1 Conducting scientific research in the field of construction | PC-2 Development of project products based on the results of engineering and technical design for urban development activities | PC-3 Organizational, technical and technological preparation of construction production | PC-4 Organizational and pedagogical support of students | PC-5 Organization of construction works at the capital construction facility |
| B1.V.EC.01 | Elective Module | | PC-2.1 | | | |
| B1.V.EC.01.01 | Structural Design in Steel | | PC-2.1 | | | |
| B1.V.EC.01.02 | Nanotechnology in Civil Engineering | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1 | | | |
| B1.V.EC.02 | Elective Module | PC-1.2, PC-1.3 | PC-2.1, PC-2.2 | | | |
| B1.V.EC.02.01 | Structural Design in Reinforced Concrete | | PC-2.1 | | | |
| B1.V.EC.02.02 | Building materials: Special Topics | PC-1.2, PC-1.3 | PC-2.1, PC-2.2 | | | |
| B1.V.EC.03 | Elective Module | | PC-2.1 | | | |
| B1.V.EC.03.01 | Structural Design in Reinforced Concrete: Special Topics | | PC-2.1 | | | |
| B1.V.EC.03.02 | Structural Dynamics | | PC-2.1, PC-2.2 | | | |
| B1.V.EC.04 | Elective Module | | PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |
| B1.V.EC.04.01 | Structural Design in Steel: Special Topics | | PC-2.1 | | | |
| B1.V.EC.04.02 | Modelling of Construction Processes | | PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |
| B1.V.EC.05 | Elective Module | | PC-2.1, PC-2.2 | | | |
| B1.V.EC.05.01 | Applications of Finite Element Method for Civil Engineering problems | | PC-2.1, PC-2.2 | | | |
| B1.V.EC.05.02 | Sustainability in Civil Engineering | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1, PC-2.2, PC-2.3 | | | |
| B1.V.EC.06 | Elective Module | | PC-2.1, PC-2.2 | | | |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | |
|-------------------|---|--|--|---|---|--|
| | | PC-1 Conducting scientific research in the field of construction | PC-2 Development of project products based on the results of engineering and technical design for urban development activities | PC-3 Organizational, technical and technological preparation of construction production | PC-4 Organizational and pedagogical support of students | PC-5 Organization of construction works at the capital construction facility |
| B1.V.EC.06.01 | Optimization Methods in Civil Engineering | | PC-2.1, PC-2.2 | | | |
| B1.V.EC.06.02 | Structural Stability | | PC-2.1 | | | |
| B1.V.EC.06.03 | VR and AR Technologies in Civil Engineering: Special Topics | PC-1.4 | | | | PC-5.5 |
| B1.V.EC.07 | Elective Module | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1 | | | |
| B1.V.EC.07.01 | Geometric Shaping and Analysis of Shells | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1 | | | |
| B1.V.EC.07.02 | Engineering Systems of Buildings | | PC-2.2 | | | |
| | Practice | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1, PC-2.2, PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | PC-4.1, PC-4.2, PC-4.3 | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |
| B2.O | Obligatory part | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1, PC-2.2, PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | PC-4.1, PC-4.2, PC-4.3 | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |
| B2.O.01 | Base component | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | | | PC-4.1, PC-4.2, PC-4.3 | |
| B2.O.01.01(I) | Independent Research Work (obtaining basic skills of research work) | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | | | | |
| B2.O.01.02(I) | Pedagogical Practice | | | | PC-4.1, PC-4.2, PC-4.3 | |
| B2.O.01.03(I) | Introductory Practice | | | | | |
| B2.O.02 | Variable component | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1, PC-2.2, PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |
| B2.O.02.01(AFI) | Design Practice | | PC-2.1, PC-2.2 | | | |
| B2.O.02.02(AFI) | Technological Practice | | PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |

| Code | Courses/modules that form students' competences | PROFESSIONAL COMPETENCES | | | | |
|---------------|---|--|--|---|---|--|
| | | PC-1 Conducting scientific research in the field of construction | PC-2 Development of project products based on the results of engineering and technical design for urban development activities | PC-3 Organizational, technical and technological preparation of construction production | PC-4 Organizational and pedagogical support of students | PC-5 Organization of construction works at the capital construction facility |
| B2.O.02.03(H) | Independent Research Work | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | | | | |
| B2.V | Part formed by participants in educational relations | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1, PC-2.2, PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |
| B2.V.01(PG) | Pre-Graduation Practice | PC-1.1, PC-1.2, PC-1.3, PC-1.4 | PC-2.1, PC-2.2, PC-2.3 | PC-3.1, PC-3.2, PC-3.3, PC-3.4, PC-3.5 | | PC-5.1, PC-5.2, PC-5.3, PC-5.4, PC-5.5 |