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
Protocol No. 19
October 31, 2022
(date, month, year)

Opened by order of the Rector of RUDN University
No. 694
November 23, 2022
(date, month, year)

PROFESSIONAL EDUCATION PROGRAMME OF HIGHER EDUCATION

Field of Studies/ Speciality:

27.03.04 Control in Technical Systems
field of studies / speciality code and title

Profile/Specialisation:

Data Engineering and Space Systems Control
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 May 21, 2021

Level of education:

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

Graduate's Qualification:

Bachalor
(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:

4 years		
(full-time education)	(part-time education)	(correspondence education)

AGREED by:

Head of Educational Programme	Chairperson of Didactic Council	Head of Educational Department
Yu.N. Razoumny	**Yu.N. Razoumny**	**Yu.N. Razoumny**
(signature)	(signature)	(signature)
(day, month, year)	(day, month, year)	(day, month, year)

2024

1. Goal (mission) of the Educational Platform

The program is focused on training highly qualified specialists in the fields of science and technology related to the study of intelligent control systems for various purposes, including in the space industry, their components, maintenance and operation, creation and maintenance of software for the study of automatic and automated control systems, as well as data engineering.

In the process of training, students undergo theoretical and practical training in order to form general cultural, general professional and professional competencies. Students gain research skills that allow them to carry out professional activities in senior positions in Russian and international companies specializing in the operation, maintenance, repair and service of intelligent control systems for various purposes, including in the rocket and space industry, in research organizations.

2. Relevance, specificity, uniqueness of the educational program

The relevance of this program is due to the great demand for data engineering specialists due to the introduction of intelligent information systems to solve management problems. This topic is socially significant and in demand among young people. Thus, the orientation of the programme not only on information technologies in management, but also on the training of highly qualified specialists in the fields of science and technology related to control in space systems, is relevant and timely. A graduate of the program is designed to be able to solve a whole range of complex computational, mathematical and technical problems that arise during the development and implementation of projects related to information systems, including their security, this is especially important for enterprises of the rocket and space industry. This requires deep knowledge in the field of information security theory, computer technology and programming, and engineering.

The program is implemented in full-time.

The program is aimed at training specialists according to professional standards: 25.015 "Specialist in the development of a flight control system for launch vehicles and spacecraft", 25.017 "Specialist in the provision of space services based on the use of remote sensing data".

The standard period for mastering the main educational program in the direction of bachelor's training 27.03.04 Management in Technical Systems for full-time education is 4 years.

The volume of the program is 240 credits. The volume of the Bachelor's program implemented in one academic year is 60 ECU.

3. The Need of the Labor Market for Training in the Field of Educational Programs

Graduates who have mastered this program are focused on working in Russian and international companies specializing in information technology, as well as the operation

of automatic control systems for various purposes: design, production, operating organizations, research centers, higher educational institutions, etc., including companies in the rocket and space industry.

4. Special requirements for potential applicants

For admission to the program, the Admission Rules are in force, approved by the relevant local regulatory act and posted in the public domain on the official website of RUDN University.

5. Features of the implementation of the EP HE

5.1. The Educational Programs of Higher Education are implemented with the possibility of using distance learning technologies and using elements of e-learning through the Telecommunication Educational and Information System of RUDN University (TUIS).

5.2. The language of implementation of the EP HE is English.

5.3. The Program does not provide for training of disabled people and persons with disabilities.

5.4. The Peoples' Friendship University of Russia named after Patrice Lumumba is implemented by the Peoples' Friendship University of Russia.

5.5. Information on the planned bases for educational/industrial practices and (or) R&D:

Practice*	**Internship Base** *(name of the organization, location)*
Research work (obtaining primary skills of research work) (educational, stationary)	Department of Mechanics and Control Processes of the Engineering Academy of the Peoples' Friendship University of Russia (Moscow), RUDN IA Mission Control Training Center (Moscow)
Technological practice (production, field)	NPO "Echelon" (Moscow) Kaspersky Lab (Moscow); JSC "Astronomical Research Center" (Moscow); JSC Polyus Research Institute named after M.F. Stelmakh (Moscow); UNIDO Centre for International Industrial Cooperation in the Russian Federation (Moscow)
Pre-diploma practice (industrial, field, stationary)	NPO "Echelon" (Moscow) JSC "Astronomical Research Center" (Moscow); Department of Mechanics and Control Processes of the Engineering Academy of the Peoples' Friendship University of Russia (Moscow), RUDN IA Mission Control Training Center (Moscow)

6. CHARACTERISTICS OF THE PROFESSIONAL ACTIVITY OF AN EP GRADUATE

6.1. Field(s) and/or sphere(s) of professional activity of a graduate who has mastered the EP HE, in which he/she can carry out his/her professional activities:

in the field of deployment, maintenance, optimization of database functioning, creation (modification) and maintenance of information systems, maintenance of information and communication systems and (or) their components in working order with a given quality;

in the field of design, modification and maintenance of information systems that automate the processes of design and technological preparation of the rocket and space industry production.

6.2. Type(s) of professional activity tasks for which the graduate is prepared to solve as part of the development of the EP HE:

– research (main);

6.3. List of generalized labor functions and labor functions related to the professional activities of a graduate of the EP HE, in accordance with which the program has been developed*

Code and name of the professional standard	**Generalized labor functions**			**Labor functions**		
	code	name	Level of qualification	Name	code	Level (sub-level) of qualification
25.015 "Specialist in the development of a flight control system for launch vehicles and spacecraft"	With	Development of schematic documentation for the LV and SC flight control system	6			
25.017 "Specialist in the provision of space services based on the use of remote sensing data"	And	Performance of individual technological operations for the creation of space products and the provision of space services based on the use of remote sensing data	6			

* - the formulation of labor functions is taken from the relevant Professional Standards.

7. Requirements for the results of the development of the EP HE

7.1. Upon completion of the EP HE, the graduate must have the following universal competencies (MC):

Code and name of the authorized capital	Code and name of the competency achievement indicator
GC-1. He is able to search, critically analyze and synthesize information, apply a systematic approach to solving problems.	GC-1.1. Analyzes the task, highlighting its basic components; GC-1.2. Determines and ranks the information required to solve the problem; GC-1.3. Searches for information to solve the problem by various types of requests; GC-1.4. Works with scientific texts, distinguishes facts from opinions, interpretations, evaluations and substantiates his/her conclusions using the philosophical conceptual apparatus; GC-1.5. Analyzes and contextually processes information to solve problems with the formation of their own opinions and judgments; GC-1.6. Offers options for solving the problem, analyzes the possible consequences of their use; GC-1.7. Analyzes the ways of solving problems of worldview, moral and personal character on the basis of the use of basic philosophical ideas and categories in their historical development and socio-cultural context.
GC-2. Is able to determine the range of tasks within the framework of the goal and choose the best ways to solve them, based on the current legal norms, available resources and restrictions	GC -2.1. Formulates a problem, the solution of which is directly related to the achievement of the project goal; GC -2.2. Determines the links between the tasks set and the expected results of their solution; GC -2.3. Within the framework of the tasks set, determines the available resources and limitations, the current legal norms; GC -2.4. Analyzes the schedule for the implementation of the project as a whole and chooses the best way to solve the tasks, based on the current legal norms and available resources and restrictions; GC -2.5 Monitors the progress of the project, adjusts the schedule in accordance with the results of control.
GC -3. Able to carry out social interaction and fulfill his role in a team	GC -3.1. Determines his role in the team, based on the strategy of cooperation to achieve the goal; GC -3.2. Formulates and takes into account in its activities the features of the behavior of groups of people identified depending on the set goal; GC -3.3. Analyzes the possible consequences of personal actions and plans their actions to achieve a given result; GC -3.4. Exchanges information, knowledge and experience with team members; GC -3.5. Argues his point of view regarding the use of the ideas of other team members to achieve the goal; GC -3.6. Participates in teamwork to fulfill assignments.
GC -4. Is able to communicate in interpersonal and intercultural	GC -4.1. Chooses the style of business communication, depending on the language of communication, the purpose and conditions of

Code and name of the authorized capital	Code and name of the competency achievement indicator
interaction in Russian (as a foreign language) and foreign language(s) on the basis of proficiency in interrelated and interdependent types of reproductive and productive foreign language speech activity, such as listening, speaking, reading, writing and translation in everyday life, socio-cultural, educational and professional, official, business and scientific spheres of communication.	partnership; GC -4.2. Adapts speech, communication style and sign language to interaction situations; GC -4.3. Searches for the necessary information to solve standard communicative tasks in Russian and foreign languages; GC -4.4. Translates professional texts from a foreign language into Russian and vice versa; GC -4.5. 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; GC -4.6. 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; GC -4.7. Forms and argues his own assessment of the main ideas of the participants in the dialogue (discussion) in accordance with the needs of joint activity.
GC -5. Is able to perceive the intercultural diversity of society in socio-historical, ethical and philosophical contexts.	GC -5.1. Interprets the history of Russia in the context of world historical development; GC -5.2. Finds and uses information about the cultural characteristics and traditions of various social groups in social and professional communication; GC -5.3. Takes into account the historical heritage and socio-cultural traditions of various social groups, ethnicities and confessions, including world religions, philosophical and ethical teachings, in social and professional communication on a given topic GC -5.4. Collects information on a given topic, taking into account the ethnic groups and confessions that are most widely represented in the points of the study GC -5.5 Substantiates the features of project and team activities with representatives of other ethnic groups and (or) faiths 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 inclusion
GC -6. Able to manage their time, build and implement a trajectory of self-development based on the principles of lifelong learning	GC -6.1. Controls the amount of time spent on specific types of activities GC -6.2. Develops tools and methods for time management when performing specific tasks, projects, goals GC -6.3. Analyzes his resources and their limits (personal, situational, temporal, etc.) for the successful completion of the task. GC -6.4. Finds and uses sources of additional information to improve the level of general and professional knowledge GC -6.5. Analyzes the main opportunities and tools of continuing education in relation to one's own interests and needs, taking into account the conditions, means, personal capabilities, stages of career growth, time perspective for the development of activities and the requirements of the labor market

Code and name of the authorized capital	Code and name of the competency achievement indicator
	GC -6.6. Defines the tasks of self-development, goals and priorities of professional growth GC -6.7. Distributes tasks into long-, medium- and short-term with justification of relevance and analysis of resources for their implementation
GC -7. Is able to maintain the proper level of physical fitness to ensure full social and professional activities	GC -7.1. Chooses health-saving technologies to maintain a healthy lifestyle, taking into account the physiological characteristics of the body GC -7.2. Plans his working and free time for the optimal combination of physical and mental load and ensuring working capacity GC -7.3. Observes and promotes the norms of a healthy lifestyle in various life situations and in professional activities"
GC -8. Is able to create and maintain safe living conditions in everyday life and in professional activities to preserve the natural environment, ensure the sustainable development of society, including in the threat and occurrence of emergencies and military conflicts	GC -8.1. Analyzes the factors of harmful impact on the life of the elements of the environment (technical means, technological processes, materials, buildings and structures, natural and social phenomena) GC -8.2. Identifies hazardous and harmful factors within the scope of the task GC -8.3. Identifies and eliminates problems related to violations of safety regulations at the workplace GC -8.4. Explains measures to prevent emergency situations GC -8.5. Explains the rules of conduct in the event of emergencies of natural and man-made origin, as well as in the event of military conflicts GC -8.6. Provides first aid, participates in recovery measures
GC -9. Able to use basic defectological knowledge in the social and professional spheres	GC -9.1. Has ideas about the principles of non-discriminatory interaction in communication in various spheres of life, taking into account the socio-psychological characteristics of persons with disabilities GC -9.2. Plans and carries out professional activities with persons with disabilities or limited health capabilities GC -9.3. Interacts with persons with disabilities in the social and professional spheres
GC -10. Able to make informed economic decisions in various areas of life	GC -10.1. Understands the basic principles of the functioning of the economy and economic development, the goals of the form of state participation in the economy GC -10.2. Applies methods of personal economic and financial planning to achieve current and long-term financial goals GC -10.3. Uses financial instruments to manage personal finances (personal budget), controls its own economic and financial risks
GC -11. Is able to form an intolerant attitude to manifestations of extremism, terrorism, corrupt behavior and counteract them in professional activities	GC -11.1. Analyzes the current legal norms that ensure the fight against corruption, terrorism and extremism in various areas of life, and also knows how to prevent corruption, extremism and terrorism in the implementation of professional activities GC -11.2. Plans, organizes and conducts events within the framework of professional activities aimed at the formation of a civic position and the prevention of manifestations of extremism, terrorism and corruption in society

Code and name of the authorized capital	Code and name of the competency achievement indicator
	GC -11.3. Observes the rules of public interaction on the basis of compliance with the current legislation and intolerant attitude to manifestations of extremism, terrorism and corruption in society
GC -12. Is able to: search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as with the help of algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems; evaluate information, its reliability, build logical conclusions based on incoming information and data	GC -12.1. Searches for the necessary sources of information and data, perceives, analyzes, remembers and transmits information using digital means, as well as with the help of algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems GC -12.2. Evaluates information, its reliability, builds logical conclusions on the basis of incoming information and data

7.2. Upon completion of the EP HE, the graduate must have the following general professional competencies (GPC):

Code and name of the defense industry	Code and name of the competency achievement indicator
GPC-1 Able to analyze the tasks of professional activity based on provisions, laws and methods in the field of natural sciences and mathematics	GPC -1.1 Has basic knowledge gained in the field of mathematical and (or) natural sciences GPC -1.2 Knows how to use them in professional activities GPC -1.3 Has the skills to choose methods for solving problems of professional activity based on theoretical knowledge
GPC -2 Able to formulate tasks of professional activity based on knowledge, profile sections of mathematical and natural science disciplines (modules)	GPC -2.1 Possesses mathematical methods, basics of programming and specialized programming systems for the implementation of algorithms for solving applied problems GPC -2.2 Is able to select and adapt mathematical methods and software to solving practical problems GPC -2.3 Possesses the skills of developing and implementing algorithms for solving applied problems in the field of professional activity
GPC -3 Able to use fundamental knowledge to solve basic management problems in technical systems in order to improve professional activities	GPC -3.1 Knows the theoretical foundations and principles of mathematical modeling GPC -3.2 Knows how to develop and use methods of mathematical modeling, information technology to solve problems of applied mathematics GPC -3.3 Possesses practical skills in solving problems of applied mathematics, methods of mathematical modeling, information technologies and the basics of their use in professional activities, skills of professional thinking and an arsenal of methods and approaches necessary for the adequate use of modern mathematics methods in theoretical and applied problems

Code and name of the defense industry	Code and name of the competency achievement indicator
GPC -4 Capable of assessing the effectiveness of management systems developed on the basis of mathematical methods	GPC -4.1 Knows the basic requirements of information security, existing information and communication technologies GPC -4.2 Is able to solve the problems of professional activity using information and communication technologies and taking into account the basic requirements of information security GPC-4.3 Possesses the skills of using existing information technologies to solve the problems of professional activity
GPC –5 Able to solve the problems of developing science, engineering and technology in the field of management in technical systems, taking into account the legal regulation in the field of intellectual property	GPC -5.1 Knows the theoretical foundations of digital technologies, the basics of modeling objects of professional activity, the basics of data analysis and information presentation GPC -5.2 Is able to solve problems of professional activity using existing methods of modeling, data analysis, and information presentation GPC -5.3 Possesses the skills of developing algorithms and computer programs suitable for practical application
GPC -6 Able to develop and use algorithms and programs, modern information technologies, methods and means of control, diagnostics and management, suitable for practical application in the field of his professional activity	GPC -6.1 Knows the basic algorithms and programs, modern information technologies, methods and means of control, diagnostics and management, suitable for practical application in the field of their professional activity GPC -6.2 Knows how to apply algorithms and programs, modern information technologies, methods and means of control, diagnostics and management, suitable for practical application in the field of his professional activity GPC -6.3 Confidently owns algorithms and programs, modern information technologies, methods and means of control, diagnostics and management, suitable for practical application in the field of his professional activity
GPC -7 is capable of performing the necessary calculations of individual units and devices of monitoring, automation and control systems, choosing standard automation, measuring and computer equipment when designing automation and control systems	GPC -7.1 Knows the procedure for making the necessary calculations of individual units and devices of control, automation and control systems, choose standard automation, measuring and computer equipment when designing automation and control systems GPC -7.2 Is able to make the necessary calculations of individual units and devices of control, automation and control systems, choose standard automation, measuring and computer equipment when designing automation and control systems GPC -7.3 Possesses technologies for calculating individual units and devices of control, automation and control systems, choosing standard automation, measuring and computing equipment when designing automation and control systems
GPC-8 Capable of setting up measuring and control facilities and complexes, carrying out their routine maintenance	GPC -8.1 Knows the parameters and characteristics of measuring and control facilities and complexes GPC -8.2 Able to carry out routine maintenance of measuring and control facilities and complexes GPC -8.3 Provides adjustment of measuring and control facilities and complexes and their routine maintenance
GPC -9 Capable of performing experiments according to specified methods and processing the results using modern	GPC -9.1 Knows modern information technologies and technical means GPC -9.2 Knows how to use modern information technologies and technical means to process the results of experiments GPC -9.3 Possesses modern information technologies and technical

Code and name of the defense industry	Code and name of the competency achievement indicator
information technologies and technical means.	means for performing experiments and processing the results
GPC -10 Capable of developing (on the basis of current standards) technical documentation (including in electronic form) for routine maintenance of systems and means of control, automation and management	GPC-10.1 Knows the current standards for the development of technical documentation for routine maintenance of systems and means of control, automation and management GPC-10.2 Knows the basic approaches to the development of technical documentation (including in electronic form) for routine maintenance of systems and means of control, automation and management GPC-10.3 Possesses the skills to develop (based on current standards) technical documentation (including in electronic form) for routine maintenance of systems and means of control, automation and management
GPC-11 Able to understand the principles of modern information technology and use them to solve professional problems	GPC -11.1 Knows digital methods and technologies used in professional activities GPC-11.2 Is able to apply digital methods and technologies in professional activities to study and model objects of professional activity, analyze data, and present information GPC-11.3 Confidently owns digital methods and technologies in professional activities (in the field of management in technical systems) for: studying and modeling objects of professional activity, data analysis, presenting information

7.3. List of professional competencies (PC)* that a graduate who has fully mastered the EP HE must have:

Code and name of the authorized capital	**Code and name of the competency achievement indicator**	**Code and name of the professional standard,** on the basis of which the SC is formulated
Research		
PC-1 Capable of collecting, processing and interpreting the data of modern scientific research necessary for the formation of conclusions on relevant scientific research, including remote sensing data of the Earth	PC-1.1 Knows modern methods of how to collect, process and interpret modern scientific research data necessary to form conclusions from relevant scientific research PC-1.2 Knows how to apply modern methods and means for processing and interpreting research data PC-1.3 Possesses the basic skills of collecting, processing and interpreting data from modern scientific research necessary to form conclusions on relevant scientific research	25.017 "Specialist in the provision of space services based on the use of remote sensing data"
PC-2 Able to participate in the development of schematic documentation for the flight control system for launch vehicles and spacecraft, in the preparation of publications on the results of research and development	PC-2.1 Knows the basic approaches to the development of mathematical models of units, functional modules and devices of the flight control system of launch vehicles and spacecraft PC-2.2 Able to write analytical reviews and scientific and technical reports on the results of research and development PP-2.3 He has skills in designing functional units and blocks of the flight control system of launch vehicles and spacecraft	25.015 "Specialist in the development of a flight control system for launch vehicles and spacecraft"
PC-3 Capable of processing and analyzing information in the field of application of mathematical methods and information technologies in the field of application of remote sensing data from space	PC-3.1 Knows the basic concepts in the field of application of mathematical methods and information technologies and the application of space remote sensing systems PP-3.2 He is able to solve problems of an analytical nature, offering a choice from a variety of relevant ways of solving problems, has skills in working in software packages of geographic information systems PP-3.3 Possesses practical skills in solving problems related to the acquisition, processing and application of remote sensing data from space	25.017 "Specialist in the provision of space services based on the use of remote sensing data"

PC-4 Able to formulate, analyze and solve engineering problems in the field of ballistics, motion mechanics and spacecraft motion control based on professional knowledge	PP-4.1 Knows the basic concepts and basic algorithms for solving problems in the field of ballistics, motion mechanics and motion control based on automated and automatic systems PC-4.2 Is able to solve engineering problems of an analytical nature in the field of ballistics, mechanics of motion and control of the movement of spacecraft on the basis of professional knowledge PP-4.3 Possesses the skills of using mathematical methods for processing information obtained as a result of experimental research, basic methods for analyzing the mechanics of motion and controlling the movement of spacecraft based on standard methods and software packages	25.015 "Specialist in the development of a flight control system for launch vehicles and spacecraft"
PC-5 Capable of developing, debugging, checking performance, modifying software; apply methods and tools of software design, develop and coordinate software documentation for software	PP-5.1 Knows existing system and application software, methods of design and development of software, structures and databases, program interfaces. Knows the regulatory and technical documentation for the development of software documentation PP-5.2 Is able to apply methods and tools for designing software, data structures, databases, program interfaces. Knows how to analyze regulatory and technical documentation for the development of software documentation PP-5.3 Possesses the basic skills of technologies for the development, debugging, performance testing and modification of system application software, modernization of technical solutions for software development	25.017 "Specialist in the provision of space services based on the use of remote sensing data"

8. Competency Matrix

	Name of disciplines (modules) in accordance with the curriculum	Universal Competencies											
		Able to search, critically analyze and synthesize information, apply a systematic approach to solving	Is able to determine the range of tasks within the framework of the goal and choose the best ways to solve them, based on the current legal norms, available resources and restrictions	Able to carry out social interaction and fulfill his role in a team	Is able to communicate in interpersonal and intercultural interaction in Russian (as a foreign language) and foreign language(s) on the basis of proficiency in interrelated and interdependent types of reproductive and productive foreign language speech activity, such as listening, speaking	Is able to perceive the intercultural diversity of society in socio-historical, ethical and philosophical contexts	Able to manage their time, build and implement a trajectory of self-development based on the principles of lifelong learning	Is able to maintain the proper level of physical fitness to ensure full social and professional activities	Able to create and maintain safe living conditions, including in the event of emergencies	Able to use basic defectological knowledge in the social and professional spheres	Able to make informed economic decisions in various areas of life	UK-11. Is able to form an intolerant attitude to manifestations of extremism, terrorism, corrupt behavior and counteract them in professional activities	Is able to: search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as with the help of algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems; evaluate information, its reliability, build logical conclusions based on incoming information and data
Index	**Mandatory part**	GC-1	GC -2	GC -3	GC -4	GC -5	GC -6	GC -7	GC -8	GC -9	GC -10	GC -11	GC -12
B1.O.01.01	Algebra and Geometry												
B1.O.01.02	Mathematical Analysis												
B1.O.01.03	Physics / Физика												
B1.O.01.04	Theory of Probability and Mathematical Statistics												
B1.O.01.05	Differential Equations / Дифференциальные												

B1.O.01.06	History of Russia / История России	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 GC-1.6 GC-1.7				GC-5.1 GC-5.2 GC-5.3 GC-5.4 GC-5.5 GC-5.6							
B1.O.01.07	Safe Living Basics												
B1.O.01.08	Complex Analysis												
B1.O.01.09	Jurisprudence / Правоведение	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 GC-1.6 GC-1.7	GC-2.1 GC -2.2 GC -2.3 GC -2.4 GC -2.5						GC-8.1 GC-8.2 GC-8.3 GC-8.4 GC-8.5 GC-8.6	GC-9.1 GC-9.2 GC-9.3	GC-10.1 GC-10.2 GC-10.3	GC-11.1 GC-11.2 GC-11.3	
B1.O.01.10	Philosophy / Философия	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 GC-1.6 GC-1.7				GC-5.1; GC-5.2; GC-5.3; GC-5.4; GC-5.5; GC-5.6;	GC-6.4 GC-6.5 GC-6.6 GC-6.7						
B1.O.01.11	Equations of Mathematical Physics												
B1.O.01.12	Physical Culture						GC-6.1 GC-6.2 GC-6.3	GC-7.1 GC-7.2 GC-7.3					
B1.O.01.DV.01.01	Foreign Language				GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6 GC-4.7								
B1.O.01.DV.01.02	Russian as a Foreign Language				GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC – 4.6 GC-4.7								
B1.O.02	**Variable component**												

B1.O.02.01	Second Foreign Language (practical course)			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-4.7								
B1.O.02.02	Computer Science and Programming												GC-12.1;GC-12.2;
B1.O.02.03	Theoretical Mechanics												
B1.O.02.04	Space Flight Mechanics												
B1.O.02.05	Analysis of Geoinformation Data												GC-12.1;GC-12.2;
B1.O.02.06	Numerical Methods												
B1.O.02.07	Automatic Control Theory												GC-12.1;GC-12.2;
B1.O.02.08	Optimal Control Methods												GC-12.1;GC-12.2;
B1.O.02.DV.01.01	Professional Russian (as a foreign language) in professional activity				GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5								
B1.O.02.DV.01.02	Foreign Language in professional activities				GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5								
	Part formed by the participants of educational relations												
B1.V.DV.01.01	Applied Physical Education							GC-7.1 GC-7.2 GC-7.3					
B1.V.DV.02.0	Discrete Mathematics												
B1.V.DV.02.0	Discrete Mathematics												

B1.V.DV.03.01	Fundamentals of information security and cyber resilience												GC-12.1;GC-12.2;
B1.V.DV.03.02	Fundamentals of Information Security and Cyber Resilience												GC-12.1;GC-12.2;
B1.V.DV.04.01	Business Communications			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-4.7;	GC-5.1; GC-5.2; GC-5.3; GC-5.4; GC-5.5; GC-5.6;							
B1.V.DV.04.02	Culture of Scientific and Business Speech			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-4.7;	GC-5.1; GC-5.2; GC-5.3; GC-5.4; GC-5.5; GC-5.6;							
B1.V.DV.05.01	Virtual and Augmented Reality Technology												
B1.V.DV.05.02	Virtual and augmented reality technologies												
B2.O.01	**Practice. Variable component**												
B2.O.01.01(U)	Research Work	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 GC-1.6 GC-1.7	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-4.7;	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-6.5;GC-6.6;GC-6.7;	GC-7.1; GC-7.2; GC-7.3;	GC-8.1;GC-8.2;GC-8.3;GC-8.4;GC-8.5;GC-8.6;	GC-9.1;GC-9.2;GC-9.3;	GC-10.1;GC-10.2;GC-10.3;	GC-11.1;GC-11.2;GC-11.3;	GC-12.1;GC-12.2;
B2.O.01.02(P)	Technological Training	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 GC-1.6 GC-1.7	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;			UK-6.1;GC-6.2;GC-6.3;GC-6.4;GC-6.5;GC-6.6;GC-						GC-12.1;GC-12.2;

B2.O.01.03(PD)	Undergraduate Training	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 GC-1.6 GC-1.7	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-4.7;	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-6.5;GC-6.6;GC-6.7;	GC-7.1;GC-7.2;GC-7.3;	GC-8.1;GC-8.2;GC-8.3;GC-8.4;GC-8.5;GC-8.6;	GC-9.1;GC-9.2;GC-9.3;	GC-10.1;GC-10.2;GC-10.3;	GC-11.1;GC-11.2;GC-11.3;	GC-12.1;GC-12.2;
B3.01(G)	State Exam	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 GC-1.6 GC-1.7	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-4.7;	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-6.5;GC-6.6;GC-6.7;	GC-7.1;GC-7.2;GC-7.3;	GC-8.1;GC-8.2;GC-8.3;GC-8.4;GC-8.5;GC-8.6;	GC-9.1;GC-9.2;GC-9.3;	GC-10.1;GC-10.2;GC-10.3;	GC-11.1;GC-11.2;GC-11.3;	GC-12.1;GC-12.2;
B3.02(D)	Graduate Qualification Work	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5 GC-1.6 GC-1.7	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-4.7;	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-6.5;GC-6.6;GC-6.7;	GC-7.1;GC-7.2;GC-7.3;	GC-8.1;GC-8.2;GC-8.3;GC-8.4;GC-8.5;GC-8.6;	GC-9.1;GC-9.2;GC-9.3;	GC-10.1;GC-10.2;GC-10.3;	GC-11.1;GC-11.2;GC-11.3;	GC-12.1;GC-12.2;

	Name of disciplines (modules) in accordance with the curriculum	General professional competencies										
		Able to analyze management tasks in technical systems based on acquired knowledge	Is able to formulate management problems in technical systems based on knowledge in specialized sections of mathematical and natural science disciplines	Able to use fundamental knowledge to solve basic management problems in technical systems in order to improve professional activities	Able to assess the effectiveness of management systems developed on the basis of mathematical methods	Able to solve the problems of the development of science, engineering and technology in the field of management in technical systems, taking into account the legal regulation in the field of intellectual property	Is able to develop and use algorithms and programs, modern information technologies, methods and means of control, diagnostics and management, suitable for practical application in the field of his professional activity	Able to perform the necessary calculations of individual units and devices of monitoring, automation and control systems, to select standard automation, measuring and computer equipment in the design of automation and control systems	Able to set up measuring and control facilities and complexes, carry out their routine maintenance	Able to perform experiments according to specified methods and process the results using modern information technologies and technical means	Able to develop (on the basis of current standards) technical documentation (including in electronic form) for routine maintenance of systems and means of control, automation and management	Able to understand the principles of modern information technology and use them to solve professional problems
Index	Mandatory part	GPC-1	GPC -2	GPC -3	GPC -4	GPC -5	GPC -6	GPC -7	GPC -8	GPC -9	GPC -10	GPC -11
B1.O.01.01	Algebra and Geometry	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								
B1.O.01.02	Mathematical Analysis	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								
B1.O.01.03	Physics / Физика	GPC-1.1 GPC -1.2 GPC -1.3										
B1.O.01.04	Theory of Probability and Mathematical Statistics	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								

B1.O.01.05	Differential Equations / Дифференциальные	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								
B1.O.01.06	History of Russia / История России											
B1.O.01.07	Safe Living Basics											
B1.O.01.08	Complex Analysis	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								
B1.O.01.09	Jurisprudence / Правоведение											
B1.O.01.10	Philosophy / Философия											
B1.O.01.11	Equations of Mathematical Physics	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								
B1.O.01.12	Physical Culture											
B1.O.01.DV.0	Foreign Language											
B1.O.01.DV.0 1.02	Russian as a Foreign Language											
B1.O.02	**Variable component**											
B1.O.02.01	Second Foreign Language (practical course)											
B1.O.02.02	Computer Science and Programming		GPC -2.1 GPC -2.2 GPC-2.3				GPC-6.1 GPC –6.2 GPC -6.3			GPC-9.1 GPC-9.2 GPC-9.3		GPC-11.1 GPC-11.2 GPC-11.3
B1.O.02.03	Theoretical Mechanics	GPC-1.1 GPC -1.2 GPC -1.3		GPC-3.1 GPC -3.2 GPC -3.3		GPC-5.1 GPC -5.2 GPC -5.3						
B1.O.02.04	Space Flight Mechanics	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-11.1 GPC-11.2 GPC-11.3
B1.O.02.05	Analysis of Geoinformation Data		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-9.1 GPC-9.2 GPC-9.3		
B1.O.02.06	Numerical Methods		GPC -2.1 GPC -2.2 GPC-2.3	GPC-3.1 GPC -3.2 GPC -3.3								

B1.O.02.07	Automatic Control Theory		GPC -2.1 GPC -2.2 GPC-2.3	GPC-3.1 GPC -3.2 GPC -3.3		GPC-5.1 GPC -5.2 GPC -5.3	GPC-6.1 GPC –6.2 GPC -6.3	OPK- 7.1OPK- 7.2OPK-7.3			GPC-10.1 GPC-10.2 GPC-10.3	
B1.O.02.08	Optimal Control Methods			GPC-3.1 GPC -3.2 GPC -3.3					GPC-8.1 GPC-8.2 GPC-8.3	GPC-9.1 GPC-9.2 GPC-9.3		GPC-11.1 GPC-11.2 GPC-11.3
B1.O.02.DV.01.01	Professional Russian (as a foreign language) in											
B1.O.02.DV.01.02	Foreign Language in professional activities											
	Part formed by the participants of educational											
B1.V.DV.01.0	Applied Physical Education											
B1.V.DV.02.01	Discrete Mathematics											
B1.V.DV.02.0	Discrete Mathematics											
B1.V.DV.03.01	Fundamentals of information security and cyber resilience											
B1.V.DV.03.02	Fundamentals of Information Security and Cyber											
B1.V.DV.04.0	Business Communications											
B1.V.DV.04.02	Culture of Scientific and Business Speech											
B1.V.DV.05.01	Virtual and Augmented Reality Technology											
B1.V.DV.05.02	Virtual and augmented reality technologies											
B2.O.01	**Practice. Variable component**											
B2.O.01.01(U)	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-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					

B2.O.01.02(P)	Technological Training	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-9.1 GPC-9.2 GPC-9.3	GPC-10.1 GPC-10.2 GPC-10.3	GPC-10.1 GPC-10.2 GPC-10.3
B2.O.01.03(PD)	Undergraduate Training	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	GPC-7.1 GPC-7.2 GPC-7.3	GPC-8.1 GPC-8.2 GPC-8.3	GPC-9.1 GPC-9.2 GPC-9.3	GPC-10.1 GPC-10.2 GPC-10.3	GPC-10.1 GPC-10.2 GPC-10.3
B3.01(G)	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	GPC-7.1 GPC-7.2 GPC-7.3	GPC-8.1 GPC-8.2 GPC-8.3	GPC-9.1 GPC-9.2 GPC-9.3	GPC-10.1 GPC-10.2 GPC-10.3	GPC-10.1 GPC-10.2 GPC-10.3
B3.02(D)	Graduate Qualification 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-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	GPC-7.1 GPC-7.2 GPC-7.3	GPC-8.1 GPC-8.2 GPC-8.3	GPC-9.1 GPC-9.2 GPC-9.3	GPC-10.1 GPC-10.2 GPC-10.3	GPC-10.1 GPC-10.2 GPC-10.3

Professional competencies						
	Name of disciplines (modules) in accordance with the curriculum	Able to conduct computational experiments using standard software in order to obtain mathematical models of processes and objects of automation and control	Able to participate in the preparation of analytical reviews and scientific and technical reports on the results of the work performed, in the preparation of publications on the results of research and development	Able to implement correct data processing, efficient data exchange and basic reconnaissance of large complex data sets	Able to develop formal access control models in the design, implementation and implementation of automated systems in a secure execution	It is able to collect and analyze initial data for the calculation and design of automation and control systems and tools
Block 1	**Mandatory part**	PC-1	PC-2	PC-3	PP-4	PP-5
B1.O.01.01	Algebra and Geometry					
B1.O.01.02	Mathematical Analysis					
B1.O.01.03	Physics / Физика					
B1.O.01.04	Theory of Probability and Mathematical Statistics					
B1.O.01.05	Differential Equations / Дифференциальные					
B1.O.01.06	History of Russia / История России					
B1.O.01.07	Safe Living Basics					
B1.O.01.08	Complex Analysis					

B1.O.01.09	Jurisprudence / Правоведение					
B1.O.01.10	Philosophy / Философия					
B1.O.01.11	Equations of Mathematical Physics					
B1.O.01.12	Physical Culture					
B1.O.01.DV.01.01	Foreign Language					
B1.O.01.DV.01.02	Russian as a Foreign Language					
B1.O.02	Variable component					
B1.O.02.01	Second Foreign Language (practical course)					
B1.O.02.02	Computer Science and Programming	PC-1.1 PC-1.2 PC-1.3				PP-5.1 PP-5.2 PP-5.3
B1.O.02.03	Theoretical Mechanics	PC-1.1 PC-1.2 PC-1.3			PP-4.1 PC-4.2 PP-4.3	
B1.O.02.04	Space Flight Mechanics	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PP-2.3		PP-4.1 PC-4.2 PP-4.3	
B1.O.02.05	Analysis of Geoinformation Data	PC-1.1 PC-1.2 PC-1.3		PC-3.1 PP-3.2 PP-3.3		PP-5.1 PP-5.2 PP-5.3
B1.O.02.06	Numerical Methods	PC-1.1 PC-1.2 PC-1.3				
B1.O.02.07	Automatic Control Theory	PC-1.1 PC-1.2 PC-1.3				
B1.O.02.08	Optimal Control Methods	PC-1.1 PC-1.2 PC-1.3			PP-4.1 PC-4.2 PP-4.3	
B1.O.02.DV.01.01	Professional Russian (as a foreign language) in professional activity					

B1.O.02.DV.01.02	Foreign Language in professional activities					
	Part formed by the participants of educational					
B1.V.DV.01.01	Applied Physical Education					
B1.V.DV.02.01	Discrete Mathematics	PC-1.1 PC-1.2 PC-1.3				
B1.V.DV.02.02	Discrete Mathematics	PC-1.1 PC-1.2 PC-1.3				
B1.V.DV.03.01	Fundamentals of information security and cyber resilience					PP-5.1 PP-5.2 PP-5.3
B1.V.DV.03.02	Fundamentals of Information Security and Cyber Resilience					PP-5.1 PP-5.2 PP-5.3
B1.V.DV.04.01	Business Communications					
B1.V.DV.04.02	Culture of Scientific and Business Speech					
B1.V.DV.05.01	Virtual and Augmented Reality Technology	PC-1.1 PC-1.2 PC-1.3				PP-5.1 PP-5.2 PP-5.3
B1.V.DV.05.02	Virtual and augmented reality technologies	PC-1.1 PC-1.2 PC-1.3				PP-5.1 PP-5.2 PP-5.3
B2.O.01	Practice. Variable component					
B2.O.01.01(U)	Research Work	PC-1.1 PC-1.2 PC-1.3		PC-3.1 PP-3.2 PP-3.3	PP-4.1 PC-4.2 PP-4.3	PP-5.1 PP-5.2 PP-5.3
B2.O.01.02(P)	Technological Training	PC-1.1 PC-1.2 PC-1.3		PC-3.1 PP-3.2 PP-3.3	PP-4.1 PC-4.2 PP-4.3	PP-5.1 PP-5.2 PP-5.3

B2.O.01.03(PD)	Undergraduate Training	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PP-2.3	PC-3.1 PP-3.2 PP-3.3	PP-4.1 PC-4.2 PP-4.3	PP-5.1 PP-5.2 PP-5.3
B3.01(G)	State Exam	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PP-2.3	PC-3.1 PP-3.2 PP-3.3	PP-4.1 PC-4.2 PP-4.3	PP-5.1 PP-5.2 PP-5.3
B3.02(D)	Graduate Qualification Work	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PP-2.3	PC-3.1 PP-3.2 PP-3.3	PP-4.1 PC-4.2 PP-4.3	PP-5.1 PP-5.2 PP-5.3