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. 11 June 03, 2024 (date, month, year)	Opened by order of the Rector of RUDN University No. 643 November 25, 2024 (date, month, year)

PROFESSIONAL EDUCATION PROGRAMME OF HIGHER EDUCATION

Field of Studies/ Speciality:

27.04.04 Control in Technical Systems
(field of studies / speciality code and title)

Profile/Specialisation:

AIML and Space Science
(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:

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	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. The purpose (mission) of the Educational Program

The double degree program "AIML and Space Science / Artificial Intelligence, Machine Learning and Space Science" is implemented on the basis of the University of Federal State Autonomous Educational Institution of Higher Education RUDN University named after Patrice Lumumba (Russia) and is aimed at training highly qualified specialists in the field of data processing, their analysis and identification of hidden patterns, as well as in the field of digitalization of production processes; in the fields of science and technology related to management in technical systems that are used in the space industry. Specialists studying under this program will learn to apply modern programming technologies, space engineering, applied computer science, mechanics and mathematics, computer technology and modern technologies of control theory, programming, develop special software and mathematical support for solving problems of working with big data in the interests of general mechanical engineering, aerospace and other knowledge-intensive industries. The curriculum is designed in such a way that it allows students to develop the most popular professional competencies in the field of mathematical and computer modeling of the design processes and application of space systems.

During the training process, students undergo theoretical and practical training to develop universal, general professional and professional competencies. Students acquire research and scientific work skills that allow them to carry out professional activities in management positions in Russian and international companies, in industrial companies, including companies in such high-tech industries as rocket and space and information technology, as well as in research organizations.

2.***Relevance, specificity, uniqueness of the educational program***

Digitalization and work with big data are among the most popular areas of development in the modern conditions of expanding requirements for the digitalization of production processes. In this regard, the relevance of this program is an indisputable fact. The educational program is unique for training specialists in the most popular industry.

The main professional educational program in the direction 27.04.04 Control in technical systems (master's degree level) focus (profile) "AIML and Space Sciences / Artificial intelligence, machine learning and space sciences" is implemented in full-time education in accordance with the license for the right to carry out educational activities.

The duration of education under the program is 2 years.

The volume of the program is 120 credit units (hereinafter referred to as CU). The volume of the master's program, implemented in one academic year, is 60 CU.

3. The need of the labor market for graduates of this EP HE

Graduates acquire theoretical and practical skills in the field of big data processing,

mathematical modeling and development of applied computer programs, and acquire skills in solving complex technical problems. They are also specialists in space engineering and control of complex technical systems and are focused on working in Russian and international companies in various industries: industrial companies, research centers, and higher education institutions. In addition, graduates have great advantages, possessing engineering skills in the development and research of algorithmic, software and technical support for modern automation tools, control systems and information processing in various fields of technology and production.

In the professional sphere, the main consumers of the educational program are research and production enterprises (specializing in data analysis and research, development of artificial intelligence and work with large databases, space engineering and control of complex technical systems), as well as Russian space agencies. Among such enterprises are: Federal State Unitary Enterprise "State Research Institute of Aviation Systems" (GosNIIAS), Federal State Autonomous Educational Institution of Higher Education "Peoples' Friendship University of Russia named after Patrice Lumumba", Yandex LLC, etc.

4. Basic requirements for potential applicants

For admission to the program, the Admission Rules apply, approved by the relevant local regulatory act and posted in the public domain on the official website of RUDN University.http://www.rudn.ru/admissions.

5. Features of the implementation of the EP HE

5.1 The educational program is implemented using a network format, using distance learning technologies, using elements of electronic learning through the RUDN University Telecommunication Educational and Information System (TUIS).

5.2 Educational activities under the Master's degree program are carried out in English.

5.3 If necessary, the educational program of higher education can be adapted for teaching disabled people and people with limited health capabilities. Elements of electronic learning and distance learning technologies used in teaching disabled people and people with limited health capabilities provide for the possibility of receiving and transmitting information in forms accessible to them.

5.4. Information on the planned bases for conducting educational/industrial practices and/or research

Practice	Base of the internship (name of the organization, location)
Pre-graduation practice	JSC "Astronomical Research Center", Moscow

Research work	Department of Mechanics and Control Processes of the RUDN Engineering Academy (Moscow) Flight Control Training Center of the RUDN University (Moscow)

6. Characteristics of the professional activities of the graduate of the EP

*6.1.*The area(s) and/or sphere(s) of professional activity of a graduate who has mastered the educational program of higher education, in which he/she can carry out his/her professional activity:

development and implementation of new methods and technologies for big data research

conducting research and developing design solutions in the field of ballistics, dynamics and flight control of spacecraft

*6.2.*Type(s) of professional activity tasks that a graduate is preparing to solve within the framework of mastering the educational program of higher education:

Research type of tasks

6.3. Types of tasks of professional activity

List of generalized work functions and work functions related to the professional activities of a graduate of the higher education program, in accordance with which the program was developed

Code and name of the professional standard	Generalized labor functions			Labor functions		
	code	Name	skill level	Name	code	qualification level (sublevel)
06.042 «BIG DATA SPECIALIST»	D	Development and implementation of new methods and technologies for big data research	8	Improvement and development of new methods, models, algorithms, technologies and tools for working with big data	D/01.8	8
25.051 «RESEARCH ENGINEER IN DYNAMICS, BALLISTICS, AND MOTION CONTROL OF SPACE VEHICLES»	B/01.7	Conducting research and developing design solutions in the field of ballistics, dynamics and flight control of spacecraft	7	Development of methods for studying ballistic and dynamic characteristics in modeling spacecraft flight trajectories	B/01.7	7

7.Requirements for the results of mastering the educational program of higher education

7.1 Upon completion of the EP HE, the graduate must possess the following universal competencies (UC):

Code and name of the UC	Code and name of the indicator of achievement of competence
UC-1 Able to carry out critical analysis of problematic situations based on a systems approach, develop an action strategy	UC-1.1. Analyzes the task, identifying its basic components; UC-1.2. Defines and ranks the information required to solve the assigned task; UC-1.3. Conducts a search for information to solve the assigned task using various types of requests; UC-1.4. Suggests options for solving the problem, analyzes the possible consequences of their use; UC-1.5. Analyzes ways of solving problems of ideological, moral and personal nature based on the use of basic philosophical ideas and categories in their historical development and socio-cultural context.
UC-2 Capable of managing a project at all stages of its life cycle	UC-2.1. Formulates a problem, the solution of which is directly related to achieving the project goal; UC-2.2. Defines the connections between the tasks set and the expected results of their solution; UC-2.3. Within the framework of the set tasks, determines the available resources and limitations, current legal norms; UC-2.4. Analyzes the project implementation schedule as a whole and selects the optimal way to solve the tasks set, based on current legal regulations and available resources and limitations; UC-2.5. Monitors the progress of the project, adjusts the schedule in accordance with the monitoring results.
UC-3 Able to organize and manage the work of a team, developing a team strategy to achieve the set goal	UC-3.1. Defines his role in the team based on the cooperation strategy to achieve the set goal; UC-3.2. Formulates and takes into account in its activities the behavioral characteristics of groups of people, identified depending on the set goal; UC-3.3. Analyzes the possible consequences of personal actions and plans his actions to achieve a given result; UC-3.4. Carries out the exchange of information, knowledge and experience with team members; UC-3.5. Argues his point of view regarding the use of ideas of other team members to achieve the set goal; UC-3.6. Participates in teamwork to carry out assignments
UC-4 Able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction	UC-4.1. Selects a style of business communication, depending on the language of communication, purpose and conditions of partnership; UC-4.2. Adapts speech, communication style and sign language to interaction situations; UC-4.3. Searches for the necessary information to solve standard communication tasks in Russian and foreign languages; UC-4.4 Conducts business correspondence in Russian and foreign languages, taking into account the stylistic features of official and unofficial letters and socio-cultural differences in the format of correspondence; UC-4.5. Uses dialogue for cooperation in academic communication, taking into account the personality of the interlocutors, their communicative speech strategy and tactics, and the degree of formality of the situation; UC-4.6. Forms and argues his/her own assessment of the main ideas of the participants in the dialogue (discussion) in accordance with

Code and name of the UC	Code and name of the indicator of achievement of competence
	the needs of the joint activity.
UC-5 Able to analyze and take into account cultural diversity in the process of intercultural interaction	UC-5.1. Interprets the history of Russia in the context of world historical development; UC-5.2. Finds and uses information about the cultural characteristics and traditions of various social groups in social and professional communication; UC-5.3. Takes into account, during social and professional communication on a given topic, the historical heritage and socio-cultural traditions of various social groups, ethnic groups and faiths, including world religions, philosophical and ethical teachings; UC-5.4. Collects information on a given topic, taking into account the ethnic groups and religions most widely represented at the research sites; UC-5.5. Substantiates the specifics of project and team activities with representatives of other ethnic groups and (or) faiths; UC-5.6. Adheres to the principles of non-discriminatory interaction in personal and mass communication in order to perform professional tasks and strengthen social integration
UC-6 Able to define and implement priorities of one's own activities and ways of improving them based on self-assessment	UC-6.1. Controls the amount of time spent on specific types of activities; UC-6.2. Develops tools and methods for time management when performing specific tasks, projects, and goals; UC-6.3. Analyzes his resources and their limits (personal, situational, temporary, etc.) for the successful completion of the assigned task; UC-6.4. Distributes tasks into long-, medium- and short-term ones with justification of relevance and analysis of resources for their implementation.
UC-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 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	UC-7.1.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 of data with the aim of effectively using the information obtained to solve problems; UC-7.2. Conducts an assessment of information, its reliability, builds logical conclusions based on incoming information and data; UC-7.3. Has a command of modern digital technologies, methods of searching, processing, analyzing, storing and presenting information (in the field of management in technical systems) in the context of the digital economy and modern corporate information culture

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

Code and name of the GPC	Code and name of the indicator of achievement of competence
GPC-1Able to analyze and identify the natural scientific essence of control problems in technical systems based on provisions, laws and methods in the field of natural sciences and mathematics	GPC-1.1.Knows the basic laws, provisions and methods in the field of natural sciences and mathematics; GPC-1.2.Able to identify the natural scientific essence of control problems in technical systems, guided by the laws and methods of natural sciences and mathematics; GPC-1.3.Proficient in tools for analyzing control problems in technical systems.
GPC-2 is capable of formulating control problems in technical systems and substantiating methods for solving them	GPC-2.1. Knows the basic methods for solving control problems in technical systems; GPC-2.2. Able to justify methods for solving control problems in technical systems; GPC-2.3. Has mastered methods of setting control tasks in technical systems
GPC-3. Capable of independently solving control problems in technical systems based on the latest achievements of science and technology	GPC-3.1 Knows the basic approaches to solving control problems in technical systems; GPC-3.2. Able to apply basic approaches based on the latest achievements of science and technology to solving control problems in technical systems; GPC-3.3. Has mastered methods for solving control problems in technical systems based on the latest achievements of science and technology
GPC-4. Capable of assessing the effectiveness of the results of developing control systems using mathematical methods	GPC-4.1 Knows the basic mathematical methods used to evaluate the effectiveness of the results of control systems; GPC-4.2. Able to apply mathematical methods to evaluate the effectiveness of the results of management systems; GPC-4.3. Has knowledge of methods for assessing the effectiveness of management systems
GPC-5. Capable of conducting patent research, determining forms and methods of legal protection and defense of rights to the results of intellectual activity, managing rights to them to solve problems in the development of science, engineering and technology	OPC-5.1. Knows the methods and approaches to conducting patent research, forms and methods of legal protection and defense of rights to the results of intellectual activity; GPC-5.2. Able to manage rights to the results of intellectual activity to solve problems in the field of development of science, engineering and technology; OPC-5.3. Has knowledge of methods and approaches to conducting patent research, knows methods of legal protection and defense of rights to the results of intellectual activity
GPC-6. Capable of collecting and analyzing scientific and technical information, generalizing domestic and foreign experience in the field of automation and control equipment	OPC-6.1. Knows the basic methods of collecting and analyzing scientific and technical information; GPC-6.2. Able to analyze and generalize domestic and foreign experience in the field of automation and control equipment; GPC-6.3. Has knowledge of methods for collecting and analyzing scientific and technical information, and can also generalize domestic and foreign experience in the professional field
GPC-7. Capable of making an informed choice, developing and	GPC-7.1. Able to develop and implement in practice circuit and system engineering solutions for automation and control systems; GPC-7.2. Able to develop hardware and software solutions for

Code and name of the GPC	Code and name of the indicator of achievement of competence
implementing in practice circuit, system engineering and hardware-software solutions for automation and control systems	automation and control systems; GPC-7.3. Has knowledge of approaches for making a well-founded choice and implementing in practice circuit, system engineering and hardware-software solutions for automation and control systems
GPC-8. Capable of selecting methods and developing control systems for complex technical objects and technological processes	GPC-8.1. Knows the basic methods used to develop control systems for complex technical objects and technological processes; GPC-8.2. Able to develop control systems for complex technical objects and technological processes; GPC-8.3. Has skills in selecting methods and developing control systems for complex technical objects and technological processes
GPC-9. Capable of developing methods and performing experiments on existing facilities with processing of results based on information technologies and technical means	GPC-9.1. Possesses modern information technologies and technical means for conducting experiments at operating facilities; GPC-9.2. Has skills in developing methods and conducting experiments at existing facilities; GPC-9.3. Has the skills to develop methods and perform experiments at existing facilities with processing of results using information technology
GPC-10. Capable of managing the development of methodological and regulatory documents, technical documentation in the field of automation of technological processes and production, including the life cycle of products and their quality	GPC-10.1. Familiar with the main approaches to the development of methodological and regulatory documents, technical documentation in the field of automation of technological processes and production; GPC-10.2. Has knowledge of approaches to managing the development of technical documentation and regulatory documents in the field of automation of technological processes and production, including the life cycle of products and their quality

7.3. List of professional competencies (PC) that a graduate who has fully mastered the educational program of higher education must possess:

PC code and name	Code and name of the indicator of achievement of competence	**Code and name of the professional standard,**on the basis of which the PC was formulated
PC-1Able to formulate goals and objectives of scientific research in the field of aerospace systems management, select methods and means for solving professional	PC-1.1.Knows the methods and means of solving scientific research problems in the field of artificial intelligence systems and robotic systems; PC-1.2.Able to formulate the goals and objectives of scientific research in a professional field; PC-1.3.Has mastered the techniques for formulating the goals and objectives of scientific research, and knows how to choose methods and means for solving problems of professional activity	25.051

PC code and name	Code and name of the indicator of achievement of competence	Code and name of the professional standard,on the basis of which the PC was formulated
problems		
PC-2Able to apply modern theoretical and experimental methods for developing mathematical models of objects and processes under study in the field of aerospace systems management	PC-2.1.Knows modern theoretical and experimental methods used to develop mathematical models of objects under study and processes of professional activity; PC-2.2.Able to determine the effectiveness of the methods used to develop mathematical models of the objects and processes under study; PC-2.3.Has mastered modern theoretical and experimental methods for developing mathematical models of objects and processes of professional activity in the field of training	25.051
PC-3Capable of carrying out work and research on the processing and analysis of scientific and technical information obtained using geographic information systems and technologies	PC-3.1.Able to analyze the results of theoretical and experimental research; PC-3.2.Able to formulate recommendations for improving devices and systems, prepare scientific research results for publication and prepare documents for filing an application for an invention; PC-3.3.Participates in the analysis of research results, has the skills to formulate recommendations for improving devices and systems, as well as writing articles and submitting documents for registration of inventions	06.042
PC-4Capable of participating in scientific research and development of design solutions in the field of ballistics, dynamics and flight control of spacecraft	PC-4.1.Familiar with the basic methods and approaches used to solve problems in the field of artificial intelligence and robotic systems; PC-4.2.Proficient in methods for solving professional problems in the field of artificial intelligence and robotic systems; PC-4.3.Able to apply mathematical methods and modern information technologies in conducting scientific research	06.042

8. Matrix of competencies developed in students during the development of the educational program "AIML and Space Sciences / Artificial Intelligence, Machine Learning and Space Sciences" in the field of training HE 27.04.04 Control in technical systems

		Universal competencies						
	Name of disciplines (modules) in accordance with the curriculum	UC-1. Capable of carrying out a critical analysis of problematic situations based on a systems approach, developing an action strategy	UC-2. Capable of managing a project at all stages of its life cycle.	UC-3. Able to organize and manage the work of a team, developing a team strategy to achieve the set goal.	UC-4. Able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction.	UC-5. Able to analyze and take into account the diversity of cultures in the process of intercultural interaction	UC-6. Able to define and implement priorities of own activity and ways of its improvement based on self-assessment	UC-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 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
	Block 1. Disciplines (modules)							
	Mandatory part							
B1.O.01	Base Part							
B1.O.01.01	Professional Russian (as a Foreign Language) / Russian language (as a foreign language) in professional activities				UC-4.1 UC-4.2 UC-4.3 UC-4.4 UC-4.5 UC-4.6			
B1.O.01.02	History and Methodology of Science / History and methodology of science	UC-1.1 UC-1.2 UC-1.3 UC-1.4 UC-1.5	UC-2.1 UC-2.2 UC-2.3 UC-2.4 UC-2.5	UC-3.1 UC-3.2 UC-3.3 UC-3.4 UC-3.5 UC-3.6		UC-5.1 UC-5.2 UC-5.3 UC-5.4 UC-5.5 UC-5.6	UC-6.1 UC-6.2 UC-6.3 UC-6.4	UC-7.1 UC-7.2 UC-7.3

B1.O.01.03	Information Systems in Mathemetical Modelling / Information Systems in Mathemetical Modelling							UC-7.1 UC-7.2 UC-7.3
B1.O.01.04	Numerical Methods for Solving Mathematical Modeling Problems							
B1.O.02	Variable Part							
B1.O.02.01	Programming Technology / Programming Technologies							
B1.O.02.02	Machine Learning and Big Data Mining / Machine Learning and Big Data Analysis							
B1.O.02.03	Virtual Reality and Computer Vision / Virtual Reality and Computer Vision							
B1.O.02.04	Advanced Methods of Space Flight Mechanics / Modern Methods of Space Flight Mechanics							
B1.O.02.05	Advanced Methods of Remote Sensing / Modern Methods of Remote Sensing of the Earth							
B1.O.02.06	Geoinformation Systems and Applications / Geoinformation systems and their applications							
B1.O.02.07	Dynamics and Control of Space Systems / Dynamics and Control of Space Systems							
	The part formed by the participants of educational relations							
B1.V.DV.01	One choice out of two							
B1.V.DV.01.01	Artificial Neural Networks (Deep Learning)	UC-1.1 UC-1.2 UC-1.3						
B1.V.DV.01.02	Artificial Neural Networks (Deep Learning)	UC-1.1 UC-1.2 UC-1.3						
B1.V.DV.02	One choice out of two							
B1.V.DV.02.01	Artificial Neural Networks (Reinforcement Learning)	UC-1.1 UC-1.2 UC-1.3						UC-7.1 UC-7.2 UC-7.3
B1.V.DV.02.02	Artificial Neural Networks (Reinforcement Learning)	UC-1.1 UC-1.2 UC-1.3						UC-7.1 UC-7.2 UC-7.3
	Block 2. Practice							

	Mandatory part							
B2.O.01	Variable Part							
B2.O.01.01(U)	Research work / Research work	UC-1.1 UC-1.2 UC-1.3 UC-1.4 UC-1.5	UC-2.1 UC-2.2 UC-2.3 UC-2.4 UC-2.5					UC-7.1 UC-7.2 UC-7.3
B2.O.01.02(Pd)	Undergraduate Training / Pre-graduation Internship	UC-1.1 UC-1.2 UC-1.3 UC-1.4 UC-1.5	UC-2.1 UC-2.2 UC-2.3 UC-2.4 UC-2.5	UC-3.1 UC-3.2 UC-3.3 UC-3.4 UC-3.5 UC-3.6	UC-4.1 UC-4.2 UC-4.3 UC-4.4 UC-4.5 UC-4.6	UC-5.1 UC-5.2 UC-5.3 UC-5.4 UC-5.5 UC-5.6	UC-6.1 UC-6.2 UC-6.3 UC-6.4	UC-7.1 UC-7.2 UC-7.3
	Block 3. State final certification							
B3.01(G)	State Exam / State Exam	UC-1.1 UC-1.2 UC-1.3 UC-1.4 UC-1.5	UC-2.1 UC-2.2 UC-2.3 UC-2.4 UC-2.5	UC-3.1 UC-3.2 UC-3.3 UC-3.4 UC-3.5 UC-3.6	UC-4.1 UC-4.2 UC-4.3 UC-4.4 UC-4.5 UC-4.6	UC-5.1 UC-5.2 UC-5.3 UC-5.4 UC-5.5 UC-5.6	UC-6.1 UC-6.2 UC-6.3 UC-6.4	UC-7.1 UC-7.2 UC-7.3
B3.02(D)	Graduate Qualification Work / Graduate Qualification Work	UC-1.1 UC-1.2 UC-1.3 UC-1.4 UC-1.5	UC-2.1 UC-2.2 UC-2.3 UC-2.4 UC-2.5	UC-3.1 UC-3.2 UC-3.3 UC-3.4 UC-3.5 UC-3.6	UC-4.1 UC-4.2 UC-4.3 UC-4.4 UC-4.5 UC-4.6	UC-5.1 UC-5.2 UC-5.3 UC-5.4 UC-5.5 UC-5.6	UC-6.1 UC-6.2 UC-6.3 UC-6.4	UC-7.1 UC-7.2 UC-7.3

		General professional competencies									
	Name of disciplines (modules) in accordance with the curriculum	GPC-1. Capable of analyzing and identifying the natural scientific essence of control problems in technical systems based on provisions, laws and methods in the field of natural sciences and	GPC-2. Capable of formulating control problems in technical systems and substantiating methods for solving them.	GPC-3. Capable of independently acquiring new knowledge, skills and abilities to solve control problems in technical systems	GPC-4. Capable of assessing the effectiveness of control systems developed on the basis of modern mathematical methods.	GPC-5. Capable of conducting patent research, determining forms and methods of legal protection and defense of rights to the results of intellectual activity, managing rights to them to solve problems in the field of development of science, engineering and	GPC-6. Capable of collecting and analyzing scientific and technical information, generalizing domestic and foreign experience in the field of automation and control equipment.	GPC-7. Capable of making an informed choice, developing and implementing in practice circuit, system engineering and hardware-software solutions for automation and control systems	GPC-8. Capable of selecting methods and developing control systems for complex technical objects and technological processes.	GPC-9. Capable of developing methods and performing experiments at existing facilities with processing of results based on modern information technologies and technical means.	GPC-10. Capable of managing the development of methodological and regulatory documents, technical documentation in the field of automation of technological processes and production, including the life cycle of products and their quality.
	Block 1. Disciplines (modules)										
	Mandatory part										
B1.O.01	Base Part										
B1.O.01.01	Professional Russian (as a Foreign Language) / Russian language (as a foreign language) in professional activities										
B1.O.01.02	History and Methodology of Science / History and methodology of science				GPC-4.1 GPC-4.2 GPC-4.3				GPC-8.1 GPC-8.2 GPC-8.3		GPC-10.1 GPC-10.2
B1.O.01.03	Information Systems in Mathemetical Modelling / Information Systems in Mathemetical Modelling	GPC-1.1 GPC-1.2 GPC-1.3	GPC-2.1 GPC-2.2 GPC-2.3								
B1.O.01.04	Numerical Methods for Solving Mathematical Modeling Problems	GPC-1.1 GPC-1.2 GPC-1.3	GPC-2.1 GPC-2.2 GPC-2.3						GPC-8.1 GPC-8.2 GPC-8.3		
B1.O.02	Variable Part										
B1.O.02.01	Programming Technology / Programming Technologies	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.02.02	Machine Learning and Big Data Mining / Machine Learning and Big Data Analysis					GPC-5.1 GPC-5.2 GPC-5.3	GPC-6.1 GPC-6.2 GPC-6.3				
B1.O.02.03	Virtual Reality and Computer Vision / Virtual Reality and Computer Vision	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-9.1 GPC-9.2 GPC-9.3	
B1.O.02.04	Advanced Methods of Space Flight Mechanics / Modern Methods of Space Flight Mechanics	GPC-1.1 GPC-1.2 GPC-1.3		GPC-3.1 GPC-3.2 GPC-3.3				GPC-7.1 GPC-7.2 GPC-7.3			GPC-10.1 GPC-10.2
B1.O.02.05	Advanced Methods of Remote Sensing / Modern Methods of Remote Sensing of the Earth	GPC-1.1 GPC-1.2 GPC-1.3			GPC-4.1 GPC-4.2 GPC-4.3		GPC-6.1 GPC-6.2 GPC-6.3				
B1.O.02.06	Geoinformation Systems and Applications / Geoinformation systems and their applications	GPC-1.1 GPC-1.2 GPC-1.3								GPC-9.1 GPC-9.2 GPC-9.3	
B1.O.02.07	Dynamics and Control of Space Systems / Dynamics and Control of Space Systems		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-7.1 GPC-7.2 GPC-7.3		GPC-9.1 GPC-9.2 GPC-9.3	
	The part formed by the participants of educational relations										
B1.V.DV.01	One choice out of two										
B1.V.DV.01.01	Artificial Neural Networks (Deep Learning)										
B1.V.DV.01.02	Artificial Neural Networks (Deep Learning)										
B1.V.DV.02	One choice out of two										
B1.V.DV.02.01	Artificial Neural Networks (Reinforcement Learning)										
B1.V.DV.02.02	Artificial Neural Networks (Reinforcement Learning)										
	Block 2. Practice										
	Mandatory part										
B2.O.01	Variable Part										
B2.O.01.01(U)	Research work / Research work			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	GPC-7.1 GPC-7.2 GPC-7.3			GPC-10.1 GPC-10.2
B2.O.01.02(Pd)	Undergraduate Training / Pre-graduation Internship	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
	Block 3. State final certification										

B3.01(G)	State Exam / 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
B3.02(D)	Graduate Qualification Work / 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

		Professional competencies			
	Name of disciplines (modules) in accordance with the curriculum	PC-1 Able to formulate goals and objectives of scientific research in the field of aerospace systems management, select methods and means for solving professional problems	PC-2 Capable of applying modern theoretical and experimental methods for developing mathematical models of objects and processes under study in the field of aerospace systems management	PC-3 Capable of carrying out work and research on the processing and analysis of scientific and technical information obtained using geographic information systems and technologies	PC-4 Capable of participating in scientific research and development of design solutions in the field of ballistics, dynamics and flight control of spacecraft
	Block 1. Disciplines (modules)				
	Mandatory part				
B1.O.01	Base Part				
B1.O.01.01	Professional Russian (as a Foreign Language) / Russian language (as a foreign language) in professional activities				
B1.O.01.02	History and Methodology of Science / History and methodology of science		PC-2.1 PC-2.2 PC-2.3		PC-4.1 PC-4.2 PC-4.3
B1.O.01.03	Information Systems in Mathemetical Modelling / Information Systems in Mathemetical Modelling		PC-2.1 PC-2.2 PC-2.3		
B1.O.01.04	Numerical Methods for Solving Mathematical Modeling Problems				
B1.O.02	Variable Part				
B1.O.02.01	Programming Technology / Programming Technologies				
B1.O.02.02	Machine Learning and Big Data Mining / Machine Learning and Big Data Analysis				

B1.O.02.03	Virtual Reality and Computer Vision / Virtual Reality and Computer Vision		PC-2.1 PC-2.2 PC-2.3	PC-3.1 PC-3.2 PC-3.3	
B1.O.02.04	Advanced Methods of Space Flight Mechanics / Modern Methods of Space Flight Mechanics	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PC-2.3		
B1.O.02.05	Advanced Methods of Remote Sensing / Modern Methods of Remote Sensing of the Earth			PC-3.1 PC-3.2 PC-3.3	PC-4.1 PC-4.2 PC-4.3
B1.O.02.06	Geoinformation Systems and Applications / Geoinformation systems and their applications		PC-2.1 PC-2.2 PC-2.3		
B1.O.02.07	Dynamics and Control of Space Systems / Dynamics and Control of Space Systems		PC-2.1 PC-2.2 PC-2.3		PC-4.1 PC-4.2 PC-4.3
	The part formed by the participants of educational relations				
B1.V.DV.01	One choice out of two				
B1.V.DV.01.01	Artificial Neural Networks (Deep Learning)	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PC-2.3		
B1.V.DV.01.02	Artificial Neural Networks (Deep Learning)	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PC-2.3		
B1.V.DV.02	One choice out of two				
B1.V.DV.02.01	Artificial Neural Networks (Reinforcement Learning)	PC-1.1 PC-1.2 PC-1.3			PC-4.1 PC-4.2 PC-4.3
B1.V.DV.02.02	Artificial Neural Networks (Reinforcement Learning)		PC-2.1 PC-2.2 PC-2.3		
	Block 2. Practice				
	Mandatory part				
B2.O.01	Variable Part				
B2.O.01.01(U)	Research work / Research work	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PC-2.3	PC-3.1 PC-3.2 PC-3.3	PC-4.1 PC-4.2 PC-4.3
B2.O.01.02(Pd)	Undergraduate Training / Pre-graduation Internship	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PC-2.3	PC-3.1 PC-3.2 PC-3.3	PC-4.1 PC-4.2 PC-4.3

	Block 3. State final certification				
B3.01(G)	State Exam / State Exam	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PC-2.3	PC-3.1 PC-3.2 PC-3.3	PC-4.1 PC-4.2 PC-4.3
B3.02(D)	Graduate Qualification Work / Graduate Qualification Work	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PC-2.3	PC-3.1 PC-3.2 PC-3.3	PC-4.1 PC-4.2 PC-4.3