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. 8 June 17, 2019 (date, month, year)	Opened by order of the Rector of RUDN University No. 409 June 24, 2019 (date, month, year)

PROFESSIONAL EDUCATION PROGRAMME OF HIGHER EDUCATION

Field of Studies/ Speciality:

01.04.02 Applied Mathematics and Informatics
field of studies / speciality code and title

Profile/Specialisation:

Space Mission and System Design
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	**A.L. Skubachevsky**	**Yu.N. Razoumny**
(signature)	(signature)	(signature)
(day, month, year)	(day, month, year)	(day, month, year)

2024

1. EDUCATIONAL PROGRAMME GOAL (MISSION)

The program aims to train professionals capable of solving a wide range of mathematical and technical problems in various fields of knowledge and industries where mathematical modelling of complex technical systems and optimization of control processes are needed. The professional fields of application of the acquired knowledge are the design processes of near and far space missions and the thematic processing of remote sensing data in various industries, agriculture and environmental management. The courses in the program on ballistic design for space missions provide advanced knowledge necessary for carrying out professional activities in this field, including the establishment and development of national space programs in emerging economies. Much attention is given to the study of the thematic interpretation of remotely sensed data as a tool to study and monitor our planet and to help effectively use and manage its resources at the national and global levels.

2. EDUCATIONAL PROGRAMME RELEVANCE, SPECIFICITY, AND UNIQUENESS

The program trains highly qualified specialists in the field of mathematical and computer modeling of complex technical systems, application of modern IT-technologies, development of special software and mathematical software for control of complex technical systems in the interests of general engineering, aerospace and other knowledge-intensive industries

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

The main professional educational program in the direction 01.04.02 "Applied Mathematics and Informatics" (master's level) focus (profile) Space Mission and System Design is implemented in full-time education in accordance with a license for the right to carry out educational activities.
The term of education under the program is 2 years.
The volume of the program is 120 credit units (hereinafter referred to as credits). The volume of the Master's program implemented in one academic year is 60 CU.

The educational program is implemented with the use of a network form, using elements of distance learning technologies, through the Telecommunication Educational and Information System of the Peoples' Friendship University of Russia (TUIS), Microsoft Teams.
Educational activities under the master's program are carried out in the state language of the Russian Federation and in English.

4. SPECIAL REQUIREMENTS FOR POTENTIAL APPLICANTS

Graduates who have mastered this program are focused on working in Russian and international companies, academic institutions, rocket and space industry enterprises and commercial enterprises in the field of space technology development and application by gaining relevant professional competences through mastering the disciplines in the field of space flight mechanics, ballistic design of space missions, thematic processing of Earth remote sensing data and development of geoinformation systems for various industries, agriculture and environmental management.
Obtaining the RUDN Master diploma and the European Engineer diploma gives additional competitive advantages to the graduates in the labour markets in Russia and abroad. Such specialists are in demand in the labour market of any country, both developed and developing economies. Due to the high level of competences, graduates easily adapt to working life in any company.

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

A mandatory requirement for applicants is a bachelor's or specialist's degree. The applicant should have a basic understanding of spaceflight theory, a sufficient background in applied mathematics and computer science, and preferably the ability to program in a high-level language. At the same time, an individualized approach to learning in this program will enable students with different levels of entry-level backgrounds to successfully master the program.

5. FEATURES OF EDUCATIONAL PROGRAMME IMPLEMENTATION

5.1. The Educational Programme is implemented *with elements of* e-learning / distance learning technologies.

5.2. The language of the Educational Programme implementation is *English.*

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

5.4. T*he higher education programme is implemented by the Federal State Autonomous Educational Institution of Higher Education "Peoples' Friendship University of Russia" together with EPF (France).*

The information about partner organisations involved in the implementation of the Educational Programme *(educational and scientific organisations, manufacturing enterprises, etc.)* should be provided.

Name of partner organisation	**Interaction functionality**
EPF (France)	*partner university*

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

Internship*	**Internship location** *(organisation name and location)*
Orientation internship (introductory, intramural)	Eshelon, Moscow
Technological (advanced field internship, industrial, extramural)	TSNIIMash, Moscow

* The section should indicate the type (introductory/advanced field internship), the kind (orientation, technological, research, pre-graduate, etc.), and the mode (intramural/ extramural) of internship.

6. CHARACTERISTICS OF EDUCATIONAL PROGRAMME GRADUATE'S PROFESSIONAL ACTIVITIES

6.1 The field of professional activity of graduates who have mastered the Master's program includes: scientific, research organizations related to solving scientific and technical problems; research and computing centers; research and production organizations; educational organizations of higher education and professional educational organizations, public authorities, organizations of various forms of ownership, industry and business that develop and use information systems, scientific achievements, products and services in the field of applied mathematics and informatics.

6.2 Types of professional activity.

The types of professional activities for which graduates of the Master's program are prepared:

- research activities.

6.3 Tasks of professional activity.

A graduate who has mastered the master's program, in accordance with the types of tasks of professional activity that the educational program is focused on, is ready to solve the following professional tasks:

research activities:

- the construction of mathematical models and their investigation by analytical methods, the development of algorithms, methods, software, tools on the subjects of ongoing research projects.
- systems research using the methods of mathematical forecasting and systems analysis;
- developing and applying modern high-performance computing technologies, using modern supercomputers in the research carried out;
- study of new scientific results, scientific literature or research projects in accordance with the profile of the object of professional activity;
- compilation of scientific reviews, abstracts and bibliographies on the subjects of the research in progress, preparation of scientific and technical publications on the subjects of the research in progress.

Code and name of Prof. standard	**Generalized labor functions**			**Labor functions**		
	code	name	qualification level	name	code	qualification level (sublevel)
25.017 «Earth remote sensing (ERS) data-based space products and services development »	D	Determination of the strategy for the application of technologies for the creation of space products and the provision of space services based on the use of remote sensing data	7	Definition of a strategy for the application of technologies for the creation of space products and the provision of space services based on the use of remote sensing data for the management of large technical systems	D/ 01.7	7
5.051 «Research engineer on dynamics, ballistics, motion control of spacecraft»	B	Research and development of design solutions in the field of ballistics, dynamics and flight control of spacecraft	7	Development of methods for the study of ballistic and dynamic characteristics in the simulation of spacecraft flight paths	B/ 01.7	7

6.4 Object of professional activity.

The objects of professional activity of the graduates of the Master program are: mathematical modelling; mathematical physics; inverse and uncorrected problems; numerical methods; probability theory and mathematical statistics; operations research and systems analysis; optimization and optimal control; discrete mathematics; nonlinear dynamics, computer science and control; mathematical models of complex systems: theory, algorithms, applications; mathematical and computer image processing methods; mathematical and information support of economic activities; mathematical methods and software for information protection; mathematical

methods and software for computer networks; information systems and their research using methods of mathematical forecasting and system analysis; high-performance computing and parallel programming technologies; intelligent systems; software engineering; system programming; tools, technologies, resources and services for e-learning and mobile learning, scientific research automation; programming languages, algorithms, libraries and software packages, system and application software products; system and application software; databases; enterprise management systems; network technology.

7. REQUIREMENTS FOR EDUCATIONAL PROGRAMME OUTCOMES

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

Generic Competences**:**

Competence	Indicators of competence achievement
GC-1. Able to carry out a critical analysis of problem situations based on a systematic approach, to develop an action strategy.	GC-1.1 Analyzes the task, highlighting its basic components; GC-1.2 Defines and ranks the information required to solve the task; GC-1.3 Searches for information to solve the task by various types of queries; GC-1.4 Offers solutions to the problem, analyzes the possible consequences of their use; GC-1.5 Analyzes ways to solve problems of a philosophical, moral and personal nature based on the use of basic philosophical ideas and categories in their historical development and socio-cultural context.
GC-2. Able to manage a project at all stages of its life cycle.	GC-2.1 Formulates a problem, the solution of which is directly related to the achievement of the project goal; GC-2.2 Defines 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 applicable legal norms; GC-2.4 Analyzes the project implementation schedule as a whole and selects the optimal way to solve the tasks, based on the current legal norms and available resources and limitations; GC-2.5 Monitors the progress of the project, adjusts the schedule in accordance with the results of the control.

GC-3. Able to organize and manage the work of the team, developing a team strategy to achieve the goal.	GC-3.1 Defines its 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 behavioral characteristics of groups of people identified depending on the goal; GC-3.3 Analyzes the possible consequences of personal actions and plans its actions to achieve the desired result; GC-3.4 Exchanges information, knowledge and experience with team members; GC-3.5 Argues its point of view regarding the use of ideas of other team members to achieve the goal; GC-3.6 Participates in team work on the execution of assignments
GC-4. Able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction.	GC-4.1 Chooses the style of business communication, depending on the language of communication, the purpose and conditions of 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 communication tasks in Russian and foreign languages; GC-4.4 CondGCts 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-4.5 Uses dialogue for cooperation in academic communication, taking into account the personality of the interlocutors, their communicative and speech strategy and tactics, the degree of formality of the situation; GC-4.6 Forms and argues its own assessment of the main ideas of the participants of the dialogue (discussion) in accordance with the needs of joint activities.
GC-5. Able to analyze and take into account the diversity of cultures in the process of intercultural interaction.	GC-5.1 Interprets the history of Russia in the context of world historical development; GC-5.2 Finds and uses information about cultural peculiarities and traditions of various social groups in social and professional communication; GC-5.3 Takes into account the historical heritage and socio-cultural traditions of various social groups, ethnic groups and confessions, including world religions, philosophical and ethical teachings, in social and professional communication on a given topic; GC-5.4 Collects information on a given topic, taking into account the ethnicities and confessions most widely represented at the study sites; GC-5.5 Substantiates the specifics of project and team activities with representatives of other ethnicities and (or) confessions; GC-5.6 Adheres to the principles of non-discriminatory interaction in personal and mass communication in order to perform professional tasks and strengthening social integration

GC-6. Able to identify and implement the priorities of their own activities and ways to improve it based on self-assessment.	GC-6.1 Controls the amount of time spent on specific activities; GC-6.2 Develops tools and methods of time management when performing specific tasks, projects, goals; GC-6.3 Analyzes its resources and their limits (personal, situational, temporary, etc.), for the successful completion of the task; GC-6.4 Assigns tasks to long-, medium- and short-term ones with justification of relevance and analysis of resources for their implementation.
GC-7. Able to search for the necessary sources of information and data, perceive, analyze, memorize 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.	GC-7.1 Searches for the necessary sources of information and data, perceives, analyzes, remembers and transmits information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems; UC-7.2 Evaluates information, its reliability, builds logical conclusions based on incoming information and data.

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

General professional competencies:

Competence	Indicators of competence achievement
GPC-1. Able to solve actual problems of fundamental and applied mathematics.	GPC-1.1 Analyse problems in basic and applied mathematics. GPC-1.2 Formulates research problems. GPC-1.3 Solves relevant problems in basic and applied mathematics.
GPC-2. Able to improve and implement new mathematical methods for solving applied problems.	GPC-2.1 Uses results of applied mathematics to learn, adapt new methods for solving problems in the area of professional interest. GPC-2.2 Implements and improves new methods for solving applied problems in the area of professional interest. GPC-2.3 Performs qualitative and quantitative analysis of the obtained solution in order to construct an optimal variant.
GPC-3. Able to develop mathematical models and analyze them when solving problems in the field of professional activity.	GPC-3.1 Develops mathematical models in applied mathematics and computer science. GPC-3.2 Analise mathematical models to solve applied professional problems. GPC-3.3 Develops and analyses new mathematical models to solve applied problems in applied mathematics and computer science.

GPC-4. Able to combine and adapt existing ones; information and communication technologies for solving problems in the field of professional activity, taking into account the requirements of information security.	GPC-4.1 Analise applied mathematics and computer science problems using information technology. GPC-4.2 Consider basic information security requirements. GPC-4.3 Uses modern information and communication technologies to solve problems in Applied Mathematics and Computer Science, taking into account information security requirements.

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

Professional competences:

Competence	Indicators of competence achievement	Code and name of Prof. the standard on the basis of which the PC is formulated
PC-1. Able to formulate goals, tasks of scientific research in applied mathematics and computer science, computer engineering and modern programming technologies, to choose methods and means of problem solving.	PC-1.1. Has a fundamental knowledge of mathematics and/or science, programming and information technology PC-1.2. Can identify, formulate and solve standard problems in his/her own research activities in the area of applied mathematics and computer science, computer science and modern programming technologies. PC-1.3 Has practical experience of research activities in applied mathematics and computer science, computer science and modern programming technologies.	25.051
PC-2. Able to apply modern theoretical and experimental methods to develop mathematical models of investigated objects and processes related to professional activity in the field of training and to participate in their implementation in the form of software products.	PC- 2.1 Knows modern theoretical and experimental methods for developing mathematical models, innovative design tools and elements of information systems architecture PC- 2.2 Can design and implement mathematical model algorithms based on simulation languages and application packages PC- 2.3 Has practical experience in developing implementation options for information systems using innovative tools.	25.051
PC-3. Able to participate in research and	PC- 3.1 Knows basic mathematical methods and modern tools in the	25.051

Competence	Indicators of competence achievement	Code and name of Prof. the standard on the basis of which the PC is formulated
development of design solutions in the field of ballistics, dynamics and flight control of spacecraft	field of ballistic design of space systems and systems. PC- 3.2 Has basic knowledge of standards, norms and rules for the development of design solutions in the field of ballistics, dynamics and flight control of spacecraft. PC- 3.3 Can apply mathematical methods and modern information technologies for research and development of design solutions in the field of ballistics, dynamics and control of spacecraft flight.	
PC-4. Able to conduct work and research on processing and analysis of scientific and technical information in the field of application of mathematical methods and information technologies for creation of space products and provision of space services based on the use of remote sensing data and geoinformation systems	PC- 4.1 Knows fundamental principles of remote sensing, basic mathematical methods and information technology in the application of Earth remote sensing systems. Knows theory and methodology for creating thematic information products and services based on the use of remote sensing data and geographic information systems. PC- 4.2 Can solve analytical problems, can use geographic information system software packages, understands the approach to big data and basic data processing workflows, can use remote sensing materials and geographic information technology in modeling and interpretation results. PC- 4.3 Has skills to design space products and provide space services based on the use of remote sensing data and geographic information systems.	25.017
PC-5. Able to analyze, including in English, ballistic and dynamic characteristics research methods for modeling spacecraft trajectories.	PC- 5.1 Knows the developed and used techniques, including those from English-language sources, to study ballistic and dynamic characteristics when modeling spacecraft flight trajectories PC- 5.2 Can develop and modernize techniques for studying ballistic and dynamic	25.051

Competence	Indicators of competence achievement	Code and name of Prof. the standard on the basis of which the PC is formulated
	characteristics when simulating spacecraft flight trajectories PC-5.3 Has skills to create space products and provide space services based on the use of remote sensing data and geoinformation systems.	

8. MATRIX OF COMPETENCES

	Name of disciplines (modules) in accordance with the curriculum	Generic competences						
		GC-1 ability to carry out a critical analysis of problem situations based on a systematic approach, to develop an action strategy	GC -2 ability to manage a project at all stages of its life cycle	GC -3 the ability to organize and manage the work of the team, developing a team strategy to achieve the goal	GC-4 ability to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction	GC-5 ability to analyze and take into account the diversity of cultures in the process of intercultural interaction	GC-6 ability to identify and implement the priorities of their own activities and ways to improve it based on self-assessment	GC-7 ability to search for the necessary sources of information and data, perceive, analyze, memorize 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							
Б1.О.01	**Base Part**							
Б1.О.01.01	English Language / Английский язык				GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6			
Б1.О.01.02	Cross-Cultural Training / Межкультурная подготовка			GC-3.1 GC-3.2 GC-3.3	GC-4.1 GC-4.2 GC-4.3	GC-5.1 GC-5.2 GC-5.3	GC-6.1 GC-6.2 GC-6.3	

				GC-3.4 GC-3.5 GC-3.6	GC-4.4 GC-4.5 GC-4.6	GC-5.4 GC-5.5 GC-5.6	GC-6.4	
Б1.О.01.03	Programming / Программирование	GC-1.1 GC-1.2 GC-1.3 GC-1.4						GC-7.1 GC-7.2
Б1.О.01.ДВ.01	**One choice from two**							
Б1.О.01.ДВ.01.01	French for Foreign Students / Французский язык как иностранный				GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6			
Б1.О.01.ДВ.01.02	Russian for Foreign Students / Русский язык как иностранный				GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6			
Б1.О.02	**Variable Part**							
Б1.О.02.01	Databases / Базы данных	GC-1.1 GC-1.2 GC-1.3 GC-1.4						
Б1.О.02.02	Advanced Methods of Remote Sensing and Geoinformation Systems / Совеременные методы дистанционного зондирования и геоинформационные системы	GC-1.1 GC-1.2 GC-1.3 GC-1.4						GC-7.1 GC-7.2
Б1.О.02.03	Aerospace Systems / Аэрокосмические системы		GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5					

Б1.О.02.04	Structures & Materials Modelling / Моделирование конструкций и материалов	GC-1.1 GC-1.2 GC-1.3 GC-1.4						
Б1.О.02.05	System Design / Системное проектирование	GC-1.1 GC-1.2 GC-1.3 GC-1.4	GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5					
Б1.О.02.06	On-board Energy / Бортовая энергия							
Б1.О.02.07	Dynamics and Control of Space Systems / Динамика и управление космическими системами	GC-1.1 GC-1.2 GC-1.3 GC-1.4	GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5					
Б1.О.02.08	**Projects**							
Б1.О.02.08.01	Project "Drone Systems Engineering. Part 1" / Курсовой проект "Разработка систем беспилотных летательных аппаратов. Часть 1"	GC-1.1 GC-1.2 GC-1.3 GC-1.4	GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5					
Б1.О.02.08.02	Project "Drone Systems Engineering. Part 2" / Курсовой проект "Разработка систем беспилотных летательных аппаратов. Часть 2"		GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5					
	The part formed by the participants of educational relations							
Б1.В.ДВ.01	**One choice from two**							
Б1.В.ДВ.01.01	Machine Learning and Big Data Mining / Машинное обучение и анализ больших данных	GC-1.1 GC-1.2 GC-1.3 GC-1.4						GC-7.1 GC-7.2

Б1.В.ДВ.01.02	From Data Acquisition to Data Treatment / Сбор и обработка данных	GC-1.1 GC-1.2 GC-1.3 GC-1.4						GC-7.1 GC-7.2
Б1.В.ДВ.02	**One choice from two**							
Б1.В.ДВ.02.01	Applied Mechanics and Engineering / Прикладная механика и проектирование инженерных систем		GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5					
Б1.В.ДВ.02.02	Systems Engineering / Проектирование инженерных систем		GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5					
Б1.В.ДВ.03	**One choice from two**							
Б1.В.ДВ.03.01	Virtual Reality and Computer Vision / Виртуальная реальность и компьютерное зрение							GC-7.1 GC-7.2
Б1.В.ДВ.03.02	Modelling and Validation / Моделирование и валидация							GC-7.1 GC-7.2
	Block 2.Practice							
	Mandatory part							
Б2.О.01	**Variable Part**							
Б2.О.01.01(У)	Practical Training in Receiving Remote Sensing Data from Satellites and its Interpretation (online from RUDN Mission Control Center) / Научно-исследовательская работа	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5	GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5				GC-6.1 GC-6.2 GC-6.3 GC-6.4	
Б2.О.01.02(П)	Practical Training and Research in Dynamics and Control of Space Systems (online from RUDN Mission Control Center) / Научно-исследовательская работа	GC-1.1 GC-1.2 GC-1.3					GC-6.1 GC-6.2 GC-6.3	GC-7.1 GC-7.2

		GC-1.4 GC-1.5					GC-6.4	
Б2.О.01.03(П)	Technological Training / Технологическая практика	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5		GC-3.1 GC-3.2 GC-3.3 GC-3.4 GC-3.5 GC-3.6			GC-6.1 GC-6.2 GC-6.3 GC-6.4	GC-7.1 GC-7.2
Б2.О.01.04(Пд)	Pre-Graduation Internship in Industry / Преддипломная практика	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5	GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5	GC-3.1 GC-3.2 GC-3.3 GC-3.4 GC-3.5 GC-3.6	GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6	GC-5.1 GC-5.2 GC-5.3 GC-5.4 GC-5.5 GC-5.6	GC-6.1 GC-6.2 GC-6.3 GC-6.4	GC-7.1 GC-7.2
	Block 3.State final certification							
Б3.01	State Exam / Государственный экзамен	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5	GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5	GC-3.1 GC-3.2 GC-3.3 GC-3.4 GC-3.5 GC-3.6	GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6	GC-5.1 GC-5.2 GC-5.3 GC-5.4 GC-5.5 GC-5.6	GC-6.1 GC-6.2 GC-6.3 GC-6.4	GC-7.1 GC-7.2
Б3.02	Graduate Qualificalion Work / Выпускная квалификационная работа	GC-1.1 GC-1.2 GC-1.3 GC-1.4 GC-1.5	GC-2.1 GC-2.2 GC-2.3 GC-2.4 GC-2.5	GC-3.1 GC-3.2 GC-3.3 GC-3.4 GC-3.5 GC-3.6	GC-4.1 GC-4.2 GC-4.3 GC-4.4 GC-4.5 GC-4.6	GC-5.1 GC-5.2 GC-5.3 GC-5.4 GC-5.5 GC-5.6	GC-6.1 GC-6.2 GC-6.3 GC-6.4	GC-7.1 GC-7.2

	Name of disciplines (modules) in accordance with the curriculum	General professional competences			
		GPC-1 ability to solve actual problems of fundamental and applied mathematics	GPC-2 ability to improve and implement new mathematical methods for solving applied problems;	GPC-3 ability to develop mathematical models and analyze them when solving problems in the field of professional activity	GPC-4 ability to combine and adapt existing ones; information and communication technologies for solving problems in the field of professional activity, taking into account the requirements of information security
	Block 1.Disciplines (modules)				
	Mandatory part				
Б1.О.01	**Base Part**				
Б1.О.01.01	English Language / Английский язык				
Б1.О.01.02	Cross-Cultural Training / Межкультурная подготовка				
Б1.О.01.03	Programming / Программирование	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
Б1.О.01.ДВ.01	**One choice from two**				

Б1.О.01.ДВ.01.01	French for Foreign Students / Французский язык как иностранный				
Б1.О.01.ДВ.01.02	Russian for Foreign Students / Русский язык как иностранный				
Б1.О.02	**Variable Part**				
Б1.О.02.01	Databases / Базы данных				GPC-4.1 GPC-4.2 GPC-4.3
Б1.О.02.02	Advanced Methods of Remote Sensing and Geoinformation Systems / Совеременные методы дистанционного зондирования и геоинформационные системы				
Б1.О.02.03	Aerospace Systems / Аэрокосмические системы		GPC-2.1 GPC-2.2 GPC-2.3	GPC-3.1 GPC-3.2 GPC-3.3	
Б1.О.02.04	Structures & Materials Modelling / Моделирование конструкций и материалов		GPC-2.1 GPC-2.2 GPC-2.3	GPC-3.1 GPC-3.2 GPC-3.3	
Б1.О.02.05	System Design / Системное проектирование		GPC-2.1 GPC-2.2 GPC-2.3	GPC-3.1 GPC-3.2 GPC-3.3	
Б1.О.02.06	On-board Energy / Бортовая энергия		GPC-2.1 GPC-2.2 GPC-2.3	GPC-3.1 GPC-3.2 GPC-3.3	
Б1.О.02.07	Dynamics and Control of Space Systems / Динамика и управление космическими системами		GPC-2.1 GPC-2.2 GPC-2.3	GPC-3.1 GPC-3.2 GPC-3.3	
Б1.О.02.08	**Projects**				
Б1.О.02.08.01	Project "Drone Systems Engineering. Part 1" / Курсовой проект "Разработка систем беспилотных летательных аппаратов. Часть 1"			GPC-3.1 GPC-3.2 GPC-3.3	GPC-4.1 GPC-4.2 GPC-4.3
Б1.О.02.08.02	Project "Drone Systems Engineering. Part 2" / Курсовой проект "Разработка систем беспилотных летательных аппаратов. Часть 2"			GPC-3.1 GPC-3.2 GPC-3.3	GPC-4.1 GPC-4.2 GPC-4.3
	The part formed by the participants of educational relations				

Б1.В.ДВ.01	**One choice from two**				
Б1.В.ДВ.01.01	Machine Learning and Big Data Mining / Машинное обучение и анализ больших данных				
Б1.В.ДВ.01.02	From Data Acquisition to Data Treatment / Сбор и обработка данных				
Б1.В.ДВ.02	**One choice from two**				
Б1.В.ДВ.02.01	Applied Mechanics and Engineering / Прикладная механика и проектирование инженерных систем				
Б1.В.ДВ.02.02	Systems Engineering / Проектирование инженерных систем				
Б1.В.ДВ.03	**One choice from two**				
Б1.В.ДВ.03.01	Virtual Reality and Computer Vision / Виртуальная реальность и компьютерное зрение				
Б1.В.ДВ.03.02	Modelling and Validation / Моделирование и валидация				
	Block 2.Practice				
	Mandatory part				
Б2.О.01	**Variable Part**				
Б2.О.01.01(У)	Practical Training in Receiving Remote Sensing Data from Satellites and its Interpretation (online from RUDN Mission Control Center) / Научно-исследовательская работа				GPC-4.1 GPC-4.2 GPC-4.3
Б2.О.01.02(П)	Practical Training and Research in Dynamics and Control of Space Systems (online from RUDN Mission Control Center) / Научно-исследовательская работа				GPC-4.1 GPC-4.2 GPC-4.3
Б2.О.01.03(П)	Technological Training / Технологическая практика		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

Б2.О.01.04(Пд)	Pre-Graduation Internship in Industry / Преддипломная практика	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
	Block 3.State final certification				
Б3.01	State Exam / Государственный экзамен	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
Б3.02	Graduate Qualificalion Work / Выпускная квалификационная работа	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

	Name of disciplines (modules) in accordance with the curriculum	Professional competences				
		PC-1. Able to formulate goals, tasks of scientific research in applied mathematics and computer science, computer engineering and modern programming technologies, to choose methods and means of problem solving.	PC-2. Able to apply modern theoretical and experimental methods to develop mathematical models of investigated objects and processes related to professional activity in the field of training and to participate in their implementation in the form of software products.	PC-3. Able to participate in research and development of design solutions in the field of ballistics, dynamics and flight control of spacecraft	PC-4. Able to conduct work and research on processing and analysis of scientific and technical information in the field of application of mathematical methods and information technologies for creation of space products and provision of space services based on the use of remote sensing data and geoinformation systems	PC-5. Able to analyze, including in English, ballistic and dynamic characteristics research methods for modeling spacecraft trajectories.
	Block 1.Disciplines (modules)					
	Mandatory part					
Б1.О.01	**Base Part**					
Б1.О.01.01	English Language / Английский язык					PC-5.1
Б1.О.01.02	Cross-Cultural Training / Межкультурная подготовка					
Б1.О.01.03	Programming / Программирование	PC-1.1 PC-1.2 PC-1.3	PC-2.1 PC-2.2 PC-2.3			
Б1.О.01.ДВ.01	**One choice from two**					
Б1.О.01.ДВ.01.01	French for Foreign Students / Французский язык как иностранный					

Б1.О.01.ДВ.01.02	Russian for Foreign Students / Русский язык как иностранный					
Б1.О.02	**Variable Part**					
Б1.О.02.01	Databases / Базы данных	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3			
Б1.О.02.02	Advanced Methods of Remote Sensing and Geoinformation Systems / Совеременные методы дистанционного зондирования и геоинформационные системы	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3		РС-4.1 РС-4.2 РС-4.3	РС-5.1 РС-5.2 РС-5.3
Б1.О.02.03	Aerospace Systems / Аэрокосмические системы			РС-3.1 РС-3.2 РС-3.3		РС-5.1 РС-5.2 РС-5.3
Б1.О.02.04	Structures & Materials Modelling / Моделирование конструкций и материалов			РС-3.1 РС-3.2 РС-3.3		РС-5.1 РС-5.2 РС-5.3
Б1.О.02.05	System Design / Системное проектирование	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3	РС-3.1 РС-3.2 РС-3.3		РС-5.1 РС-5.2 РС-5.3
Б1.О.02.06	On-board Energy / Бортовая энергия			РС-3.1 РС-3.2 РС-3.3		РС-5.1 РС-5.2 РС-5.3
Б1.О.02.07	Dynamics and Control of Space Systems / Динамика и управление космическими системами	РС-1.1 РС-1.2 РС-1.3		РС-3.1 РС-3.2 РС-3.3		РС-5.1 РС-5.2 РС-5.3
Б1.О.02.08	**Projects**					
Б1.О.02.08.01	Project "Drone Systems Engineering. Part 1" / Курсовой проект "Разработка систем беспилотных летательных аппаратов. Часть 1"		РС-2.1 РС-2.2 РС-2.3	РС-3.1 РС-3.2 РС-3.3		
Б1.О.02.08.02	Project "Drone Systems Engineering. Part 2" / Курсовой проект "Разработка систем беспилотных летательных аппаратов. Часть 2"			РС-3.1 РС-3.2 РС-3.3		
	The part formed by the participants of educational relations					

Б1.В.ДВ.01	**One choice from two**					
Б1.В.ДВ.01.01	Machine Learning and Big Data Mining / Машинное обучение и анализ больших данных	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3			
Б1.В.ДВ.01.02	From Data Acquisition to Data Treatment / Сбор и обработка данных	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3			
Б1.В.ДВ.02	**One choice from two**					
Б1.В.ДВ.02.01	Applied Mechanics and Engineering / Прикладная механика и проектирование инженерных систем	РС-1.1 РС-1.2 РС-1.3		РС-3.1 РС-3.2 РС-3.3		РС-5.1 РС-5.2 РС-5.3
Б1.В.ДВ.02.02	Systems Engineering / Проектирование инженерных систем	РС-1.1 РС-1.2 РС-1.3		РС-3.1 РС-3.2 РС-3.3		РС-5.1 РС-5.2 РС-5.3
Б1.В.ДВ.03	**One choice from two**					
Б1.В.ДВ.03.01	Virtual Reality and Computer Vision / Виртуальная реальность и компьютерное зрение	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3			
Б1.В.ДВ.03.02	Modelling and Validation / Моделирование и валидация	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3			
	Block 2.Practice					
	Mandatory part					
Б2.О.01	**Variable Part**					
Б2.О.01.01(У)	Practical Training in Receiving Remote Sensing Data from Satellites and its Interpretation (online from RUDN Mission Control Center) / Научно-исследовательская работа	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3	РС-3.1 РС-3.2 РС-3.3	РС-4.1 РС-4.2 РС-4.3	РС-5.1 РС-5.2 РС-5.3
Б2.О.01.02(П)	Practical Training and Research in Dynamics and Control of Space Systems (online from RUDN Mission Control Center) / Научно-исследовательская работа	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3	РС-3.1 РС-3.2 РС-3.3	РС-4.1 РС-4.2 РС-4.3	РС-5.1 РС-5.2 РС-5.3

Б2.О.01.03(П)	Technological Training / Технологическая практика	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3	РС-3.1 РС-3.2 РС-3.3	РС-4.1 РС-4.2 РС-4.3	РС-5.1 РС-5.2 РС-5.3
Б2.О.01.04(Пд)	Pre-Graduation Internship in Industry / Преддипломная практика	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3	РС-3.1 РС-3.2 РС-3.3	РС-4.1 РС-4.2 РС-4.3	РС-5.1 РС-5.2 РС-5.3
	Block 3.State final certification					
Б3.01	State Exam / Государственный экзамен	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3	РС-3.1 РС-3.2 РС-3.3	РС-4.1 РС-4.2 РС-4.3	РС-5.1 РС-5.2 РС-5.3
Б3.02	Graduate Qualificalion Work / Выпускная квалификационная работа	РС-1.1 РС-1.2 РС-1.3	РС-2.1 РС-2.2 РС-2.3	РС-3.1 РС-3.2 РС-3.3	РС-4.1 РС-4.2 РС-4.3	РС-5.1 РС-5.2 РС-5.3