Federal State Autonomous Educational Institution of Higher Education "Peoples' Friendship University of Russia named after Patrice Lumumba"

Academy of Engineering

(name of the main educational unit (PMU) - the developer of the EP HE)

INTERNSHIP PROGRAM

Pre-graduation practice
(name of the internship)

Internship
(type of practice: educational, industrial)

Recommended by the ICSC for the field of study/specialty:

27.03.04 Control in Technical Systems
(code and name of the direction of training/specialty)

Practical training of students is carried out as part of the implementation of the main professional educational program of higher education (EP HE):

Data Engineering and Space Systems Control
(name (profile/specialization) of the EP HE)

2024

1. PURPOSE OF THE INTERNSHIP

Pre-diploma practice is an industrial practice and is aimed at deepening, systematizing and consolidating theoretical knowledge, as well as at the final formation of professional skills and abilities in the field of scientific research in solving practical problems in the field of control in technical systems, mathematical and computer modeling of complex technical objects and systems, the use of modern programming technologies, the development of special software and mathematics for the control of complex technical objects and systems in the interests of general mechanical engineering, aerospace and other high-tech industries. Students collect, process and analyze the material necessary for the development of the final qualification work, they acquire teamwork and communication skills necessary for the development of large projects, as well as form and develop practical skills and gain experience in independent professional activities in the field of information technology in management and in the field of cybersecurity of information systems.

2. REQUIREMENTS FOR THE RESULTS OF TRAINING BASED ON THE RESULTS OF THE INTERNSHIP

The Pre-Diploma Practice is aimed at the formation of the following competencies (parts of competencies) in students:

Table 2.1. List of competencies formed in students during the internship (learning outcomes based on the results of the internship)

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
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 the problems of the worldview, moral and personal character based on 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;

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
		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	Capable of interpersonal and intercultural communication interaction in Russian (as a foreign language) and foreign language(s) on the basis of mastery of interrelated and interdependent types of reproductive and productive foreign language speech activity, such as listening, speaking, reading, writing and translation in everyday, socio-cultural, educational and professional, official, business and scientific spheres of communication.	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 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 communication taking into account the personality of the interlocutors, their communicative and speech strategy and tactics, the degree of formality of the situation; GC-4.7. 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

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
		GC-5.5 Substantiates the features 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 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 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 the 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	GC-9.1. Has ideas about the principles of non-discriminatory interaction in communication in various

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
	spheres	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 in various spheres of life, as well as ways to prevent corruption and form an intolerant attitude towards it GC-11.2. Plans, organizes and conducts activities to ensure the formation of a civic position and the prevention of corruption in society GC-11.3. Observes the rules of public interaction on the basis of compliance with the current legislation and intolerance of corruption
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
GPC-1	Is able to analyze the tasks of professional activity on the basis of provisions, laws and methods in the field of natural sciences and mathematics	GPC-1.1 Knows the basic provisions, laws and methods of natural sciences that can be applied to solve professional problems GPC-1.2 Identifies connections and patterns in solving problems related to professional activity GPC-1.3 Uses the conclusions obtained on the basis of the basic laws and methods of natural sciences and mathematics within the framework of professional activities
GPC-2	Is able to formulate the tasks of professional activity on the	GPC-2.1 Defines the tasks of professional activity from the standpoint of specialized sections of

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
	basis of knowledge, profile sections of mathematical and natural science disciplines (modules)	mathematical and natural science disciplines GPC-2.2 Knows how to use knowledge of specialized sections of mathematical and natural science disciplines to formulate the tasks of professional activity GPC-2.3 Applies knowledge of specialized sections of mathematical and natural science disciplines to develop an algorithm for solving problems 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 He has fundamental knowledge to solve basic management problems in technical systems in order to improve his professional activities GPC-3.2 Applies fundamental knowledge to solve basic management problems in technical systems in order to improve in professional activities GPC-3.3 Provides effective application of fundamental knowledge to solve management problems in technical systems in order to improve professional activities
GPC-4	Able to assess the effectiveness of management systems developed on the basis of mathematical methods	GPC-4.1 Knows methods and approaches for assessing the effectiveness of management systems GPC-4.2 Is able to apply known methods and approaches to assess the effectiveness of management systems GPC-4.3 Evaluates the effectiveness of management systems using methods developed on the basis of mathematical methods
GPC-5	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	GPC-5.1 Defines the goals for solving the problems of the development of science, engineering and technology in the field of management in technical systems GPC-5.2 Knows and uses methods 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 GPC-5.3 Provides solutions to the problems of 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
GPC-6	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	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

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
GPC-7	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	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	Able to set up measuring and control facilities and complexes, carry 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	Is able to perform experiments according to specified methods and process the results using modern information technologies and technical means.	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 means for performing experiments and processing the results
GPC-10	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	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

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
PC-1	Able to collect, process and interpret modern scientific research data necessary to form conclusions on relevant scientific research, including Earth remote sensing data	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
PC-2	Able to participate in the development of schematic documentation for the flight control system of 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
PC-3	He is able to carry out work on the processing and analysis of information in the field of the application of mathematical methods and information technologies in the field of the 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
PP-4	Able to formulate, analyze, and solve engineering problems in ballistics, propulsion 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
PP-5	Able to develop, debug, test performance, modify 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

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
		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

3. PLACE OF PRACTICE IN THE STRUCTURE OF THE EDUCATIONAL PROGRAM OF HIGHER EDUCATION

Technological practice refers to the variable component <u>of the mandatory part of block 2 of the curriculum</u>.

Within the framework of the EP HE, students also master disciplines and/or other practices that contribute to the achievement of the planned learning outcomes based on the results of technological practice.

Table 3.1. List of components of the EP HE that contribute to the achievement of the planned learning outcomes based on the results of the internship

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
GC-1	He is able to search, critically analyze and synthesize information, apply a systematic approach to solving problems.	History of Russia / История России Philosophy / Философия Jurisprudence / Правоведение Research Work Technological Training	State Final Certification
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	Jurisprudence / Правоведение Research Work Technological Training	State Final Certification
GC-3	Able to carry out social interaction and fulfill his role in a team	Second Foreign Language (practical course) Business Communications Culture of Scientific and Business Speech Research Work Technological Training	State Final Certification
GC-4	Capable of interpersonal and intercultural communication interaction in Russian (as a foreign language) and foreign language(s) on the basis of mastery of interrelated and	Foreign Language Russian as a Foreign Language Second Foreign Language (practical course) Professional Russian (as a foreign language) / Foreign	State Final Certification

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
	interdependent types of reproductive and productive foreign language speech activity, such as listening, speaking, reading, writing and translation in everyday, socio-cultural, educational and professional, official, business and scientific spheres of communication.	Language in professional activities Professional Russian (as a foreign language) in professional activity Foreign Language in professional activities Business Communications Culture of Scientific and Business Speech Research Work	
GC-5	Is able to perceive the intercultural diversity of society in socio-historical, ethical and philosophical contexts.	History of Russia / История России Philosophy / Философия Business Communications Culture of Scientific and Business Speech Research Work	State Final Certification
GC-6	Able to manage their time, build and implement a trajectory of self-development based on the principles of lifelong learning	Physical Culture Research Work Technological Training	State Final Certification
GC-7	Is able to maintain the proper level of physical fitness to ensure full social and professional activities	Physical Culture Applied Physical Education Research Work	State Final Certification
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	Safe Living Basics Jurisprudence / Правоведение Research Work	State Final Certification
GC-9	Understands the basic principles of the functioning of the economy and economic development, the goals of the form of state participation in the economy Law Introduction to the	Jurisprudence / Правоведение Research Work	State Final Certification

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
	Internet of Things Introduction to the Internet of Things		
GC-10	Able to make informed economic decisions in various areas of life	Jurisprudence / Правоведение Research Work	State Final Certification
GC-11	Is able to form an intolerant attitude to manifestations of extremism, terrorism, corrupt behavior and counteract them in professional activities	Jurisprudence / Правоведение Research Work	State Final Certification
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	Computer Science and Programming Analysis of Geoinformation Data Automatic Control Theory Optimal Control Methods Fundamentals of information security and cyber resilience Fundamentals of Information Security and Cyber Resilience Research Work Technological Training	State Final Certification
GPC-1	Is able to analyze the tasks of professional activity on the basis of provisions, laws and methods in the field of natural sciences and mathematics	Algebra and Geometry Mathematical Analysis Physics / Физика Theory of Probability and Mathematical Statistics Differential Equations Complex Analysis Equations of Mathematical Physics Theoretical Mechanics Space Flight Mechanics Research Work Technological Training	State Final Certification
GPC-2	Is able to formulate the tasks of professional activity on the basis of knowledge, profile sections of mathematical and natural science disciplines (modules)	Algebra and Geometry Mathematical Analysis Theory of Probability and Mathematical Statistics Differential Equations Complex Analysis	State Final Certification

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
		Equations of Mathematical Physics Computer Science and Programming Space Flight Mechanics Analysis of Geoinformation Data Numerical Methods Automatic Control Theory Research Work Technological Training	
GPC-3	Able to use fundamental knowledge to solve basic management problems in technical systems in order to improve professional activities	Algebra and Geometry Mathematical Analysis Theory of Probability and Mathematical Statistics Differential Equations Complex Analysis Equations of Mathematical Physics Theoretical Mechanics Space Flight Mechanics Analysis of Geoinformation Data Numerical Methods Automatic Control Theory Optimal Control Methods Research Work Technological Training	State Final Certification
GPC-4	Able to assess the effectiveness of management systems developed on the basis of mathematical methods	Analysis of Geoinformation Data Research Work Technological Training	State Final Certification
GPC-5	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	Theoretical Mechanics Analysis of Geoinformation Data Automatic Control Theory Research Work Technological Training	State Final Certification
GPC-6	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	Computer Science and Programming Space Flight Mechanics Automatic Control Theory Research Work	State Final Certification

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
	professional activity		
GPC-7	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	Automatic Control Theory	State Final Certification
GPC-8	Able to set up measuring and control facilities and complexes, carry out their routine maintenance	Optimal Control Methods	State Final Certification
GPC-9	Is able to perform experiments according to specified methods and process the results using modern information technologies and technical means.	Computer Science and Programming Analysis of Geoinformation Data Optimal Control Methods Technological Training	State Final Certification
GPC-10	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	Automatic Control Theory Technological Training	State Final Certification
GPC-11	Able to understand the principles of modern information technology and use them to solve professional problems	Computer Science and Programming Space Flight Mechanics Optimal Control Methods Technological Training	State Final Certification
PC-1	Able to collect, process and interpret modern scientific research data necessary to form conclusions on relevant scientific research, including Earth remote sensing data	Computer Science and Programming Computer Science and Programming Space Flight Mechanics Analysis of Geoinformation Data Numerical Methods Automatic Control Theory Optimal Control Methods Discrete Mathematics Discrete Mathematics Virtual and Augmented Reality Technology	State Final Certification

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
		Virtual and augmented reality technologies Research Work Technological Training	
PC-2	Able to participate in the development of schematic documentation for the flight control system of launch vehicles and spacecraft, in the preparation of publications on the results of research and development	Space Flight Mechanics	State Final Certification
PC-3	He is able to carry out work on the processing and analysis of information in the field of the application of mathematical methods and information technologies in the field of the application of remote sensing data from space	Analysis of Geoinformation Data Research Work Technological Training	State Final Certification
PP-4	Able to formulate, analyze, and solve engineering problems in ballistics, propulsion mechanics, and spacecraft motion control based on professional knowledge	Theoretical Mechanics Space Flight Mechanics Optimal Control Methods Research Work Technological Training	State Final Certification
PP-5	Able to develop, debug, test performance, modify software; apply methods and tools of software design, develop and coordinate software documentation for software	Computer Science and Programming Analysis of Geoinformation Data Fundamentals of information security and cyber resilience Fundamentals of Information Security and Cyber Resilience Virtual and Augmented Reality Technology Virtual and augmented reality technologies Research Work Technological Training	State Final Certification

* - to be completed in accordance with the competency matrix and the SUP of the EP HE

4. SCOPE OF PRACTICE

The total workload of the Pre-Diploma Practice is 15 credits (540 academic hours).

5. CONTENT OF THE INTERNSHIP

Table 5.1. Internship content*

Name of the practice section	Content of the section (topics, types of practical activities)	Labor intensity, ac.p.
Section 1. Organizational and preparatory.	Receiving an individual assignment for practice from the supervisor	9
	Safety briefing in the workplace (in the laboratory and/or in production)	9
Section 2. Research	Introductory lectures	18
	Familiarization with the technological site / research laboratory of the enterprise	36
	Selection of research objects, drawing up a practice plan and a plan for a research final qualification work	18
	Control and approval of plans for the pre-diploma practice of the research graduation Qualification Work	20
	Computational and graphic part: analysis of individual initial data for calculation, selection and analysis of literature, performance of calculation work	340
	Current control of the internship by the supervisor	36
	Keeping an internship diary	36
Preparation of an internship report		9
Preparation for defense and defense of the internship report		9
ALTOGETHER:		**540**

* - the content of the internship by sections and types of practical training is FULLY reflected in the student's internship report.

6. MATERIAL AND TECHNICAL SUPPORT FOR THE INTERNSHIP

To conduct pre-graduation practice, laboratories equipped with modern computer equipment with Matlab, Borland Developer Studio, Python software and Internet access are required. The safety requirements are the same as when working with personal computers.

When undergoing pre-diploma practice at RUDN University, the material and technical base of the graduating department is used, which trains bachelors in the direction of "Management in Technical Systems".

Scientific and educational laboratories of the department and enterprises in which students can practice:

Room with a list of logistics	Whereabouts
Lecture and working premises of the enterprise	At the address of the enterprise: NPO "Echelon" (Moscow) JSC "Astronomical Research Center" (Moscow);

RUDN University Mission Control Center: A set of specialized furniture; technical means: PC "Hopper" (4 pcs.), monitor 23.6 Viewsonic VG2433-LED (4 pcs.), projection screen Projecta Home Screen 316x416, LCD panel Philips 52 model BDL5231V/100, LCD panel for creating a video wall Orion OLM-4611 (1 pc.), LCD panel for creating a video wall Orion OLM-4611 (8 pcs.), Bose Companion speaker system (1 pc.), interactive 3D-Pointer system, MEIJIN computer, personal computer (Esprimo NYK3F0012776 system unit, Mont. YEFQ614055), a personal computer (Esprimo NYK3F0012794 system, mon. YEFQ614089), a personal computer (system unit Esprimo YK1M001806, mon. YESV030505), a personal computer (Esprimo YKQBO48715 system, mon. YE7J36089), a personal computer (Esprimo YL6K005094 system unit, mon. YV1PQ13636), a personal computer (Esprimo YL6K005288 system unit, mon. YV2L010546). Internet access is available	Moscow, MiklGCho-Maklaya Street, 6.

7. METHOD OF PRACTICE

Technological practice can be carried out both in the structural divisions of RUDN University or in organizations in Moscow (stationary), and at bases located outside Moscow (offsite).

Internship on the basis of an external organization (outside RUDN University) is carried out on the basis of an appropriate agreement, which specifies the terms, place and conditions of the internship in the base organization.

The terms of the internship correspond to the period specified in the calendar curriculum of the EP HE. The timing of the internship can be adjusted in agreement with the Department of Educational Policy and the Department of Organizing Internships and Promoting the Employment of Graduates at RUDN University.

8. EDUCATIONAL, METHODOLOGICAL AND INFORMATION SUPPORT OF PRACTICE

Reference citations:

1. Tolpegin, O. A. Methods of optimal management: a textbook and a workshop for universities. - 2nd ed., ispr. Moscow: Yurayt Publishing House, 2021. — 234 p. — (Higher Education). — ISBN 978-5-534-13534-3. — Text : electronic // EBS Yurayt [site]. — URL: https://urait.ru/bcode/465342.

2.	Beklaryan L. A., Flerova A. Yu., ZhGCova A. A. Metody optimal'nogo upravleniya: uchebnoe posobie [Methods of optimal management]. MIPT, 2018.

3.	Aleksandrov V.V., Zlochevsky S.I., Lemak S.S., Parusnikov N.A. Introduction to the dynamics of controlled systems. Moscow, MSU Publ., 1993.

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Foreign magazines: CAD/CAM/CAE Observer; Artificial Intelligence; IEEE Transac-tion on Automation Control; Control; IEEE Mechanical.

Resources of the information and telecommunication network "Internet":

1) Electronic Library System (EBS) of RUDN University and third-party EBS, to which university students have access on the basis of concluded contracts:

− EBS RUDN http://lib.rudn.ru/MegaPro/Web http://lib.rudn.ru/MegaPro/Web

− EBS "University Library Online" http://www.biblioclub.ru

− EBS Yurayt http://www.biblio-online.ru

− EBS "Student Consultant" www.studentlibrary.ru

− EBS "Lan" http://e.lanbook.com/

- EBS "Troitsky Bridge"
    2) Databases and search engines:
- electronic collection of legal and regulatory and technical documentation http://docs.cntd.ru/
- Yandex https://www.yandex.ru/ search engine https://www.yandex.ru/
- Google Search Engine https://www.google.ru/
- SCOPUS Abstract Database http://www.elsevierscience.ru/products/scopus/

Software:
1. Specialized software for practicing and generating reporting documentation for students:
- MATLAB
- Geographic information system QGIS 3.4 64 bit and a set of modules for it (freely distributed under the GNU General Public License version 2 (GNU GPL 2));

- Python programming language and development environment (freely distributed under the Python Software Foundation License);

- Borland Developer Studio 2006 (License Certificate Number: 33080, 33081, 33082)

Educational and methodological materials for internship, filling out a diary and drawing up an internship report*:
1) Rules of safe working conditions and fire safety during the Pre-Diploma Practice (initial briefing).
2) General structure and principle of operation of technological production equipment used by students during internship; technological maps and regulations, etc. (if necessary).
3) Methodical instructions for students to fill out a diary and draw up an internship report.
* - all educational and methodological materials for internship are posted in accordance with the current procedure on the internship page in TUIS

9. ASSESSMENT MATERIALS AND A POINT-RATING SYSTEM FOR ASSESSING THE LEVEL OF COMPETENCE FORMATION BASED ON THE RESULTS OF THE INTERNSHIP

Assessment materials and a point-rating system* for assessing the level of competence formation (part of competencies) based on the results of the Pre-Diploma Practice are presented in the Appendix to this Internship Program (module).
* - OM and BRS are formed on the basis of the requirements of the relevant local regulatory act of RUDN University (provision/procedure).

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