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

Research work (obtaining primary skills of research work)

(name of the internship)

Educational practice

(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

The purpose of the educational practice "Research work (obtaining primary skills of research work)" is to deepen, systematize and consolidate theoretical knowledge, as well as to obtain primary professional skills in the field of scientific research in solving practical problems related to the field of information technology in the management and cybersecurity of information systems, modern technologies programming, as well as in the field of application of this toolkit to perform certain types of work related to future professional activities.

The main objectives of the practice "Research work (obtaining primary skills of research work)" are:
- formation of general and professional competencies in the student;
- search and study of literature on the courses "Computer Science and Programming" and "Theory of Automatic Control";
- familiarization with the main stages of software development and testing;
- independent development of computer programs
- mastering the search for a variety of sources of information;
- formation of practical skills of independent work, skills of independent formulation of conclusions obtained from the results of their own calculations;
- development of skills for presentation and defense of the results of the work performed.

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

The educational practice "Research Work (Obtaining Primary Skills of Research Work)" 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	GC-2.1. Formulates a problem, the solution of which is directly related to the achievement of the project goal;

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
	the goal and choose the best ways to solve them, based on the current legal norms, available resources and restrictions	GC-2.2. Determines the links between the tasks set and the expected results of their solution; GC-2.3. Within the framework of the tasks set, determines the available resources and limitations, the current legal norms; GC-2.4. Analyzes the schedule for the implementation of the project as a whole and chooses the best way to solve the tasks, based on the current legal norms and available resources and restrictions; GC-2.5 Monitors the progress of the project, adjusts the schedule in accordance with the results of control.
GC-3	Able to carry out social interaction and fulfill his role in a team	GC-3.1. Determines his role in the team, based on the strategy of cooperation to achieve the goal; GC-3.2. Formulates and takes into account in its activities the features of the behavior of groups of people identified depending on the set goal; GC-3.3. Analyzes the possible consequences of personal actions and plans their actions to achieve a given result; GC-3.4. Exchanges information, knowledge and experience with team members; GC-3.5. Argues his point of view regarding the use of the ideas of other team members to achieve the goal; GC-3.6. Participates in teamwork to fulfill assignments.
GC-4	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,

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
		philosophical and ethical teachings, in social and professional communication on a given topic GC-5.4. Collects information on a given topic, taking into account the ethnic groups and confessions that are most widely represented in the points of the study GC-5.5 Substantiates the features of project and team activities with representatives of other ethnic groups and (or) faiths 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

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
		GC-8.6. Provides first aid, participates in recovery measures
GC-9	Able to use basic defectological knowledge in the social and professional spheres	GC-9.1. Has ideas about the principles of non-discriminatory interaction in communication in various spheres of life, taking into account the socio-psychological characteristics of persons with disabilities GC-9.2. Plans and carries out professional activities with persons with disabilities or limited health capabilities GC-9.3. Interacts with persons with disabilities in the social and professional spheres
GC-10	Able to make informed economic decisions in various areas of life	GC-10.1. Understands the basic principles of the functioning of the economy and economic development, the goals of the form of state participation in the economy GC-10.2. Applies methods of personal economic and financial planning to achieve current and long-term financial goals GC-10.3. Uses financial instruments to manage personal finances (personal budget), controls its own economic and financial risks
GC-11	Is able to form an intolerant attitude to manifestations of extremism, terrorism, corrupt behavior and counteract them in professional activities	GC-11.1. Analyzes the current legal norms that ensure the fight against corruption 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-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	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

Cipher	Competence	Indicators of Competency Achievement (within the framework of this discipline)
	property	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
PC-1	Able to conduct computational experiments using standard software in order to obtain mathematical models of processes and objects of automation and control	PC-1.1 Knows standard software tools and knows how to use them to conduct computational experiments PC-1.2 Is able to create mathematical models of processes and objects of automation and control using modern software PC-1.3 He is proficient in the methodology of creating mathematical models of processes and objects of automation and control, as well as conducting computational experiments using standard software
PC-2	Able to participate in the preparation of analytical reviews and scientific and technical reports on the results of the work performed, in the preparation of publications on the results of research and development	PC-2.1 Knows the basic approaches to conducting analytical reviews and creating scientific and technical reports on the results of research and development PC-2.2 She has the skills to prepare analytical reviews, scientific and technical reports, publications on the results of research PP-2.3 Participates in the preparation of analytical reviews and scientific and technical reports, reports on the results of research and development
PP-5	It is able to collect and analyze initial data for the calculation and design of automation and control systems and tools	technical support for the processes of creation, improvement and maintenance of information systems to automate the tasks of organizational and production management PP-5.2 Knows how to organize technical support for the processes of creation, improvement and maintenance of information systems that automate the tasks of organizational and production management and business processes PP-5.3 Possesses the skills of organizing technical support for the processes of creating, improving and maintaining information systems that automate the tasks of organizational and production management and business processes

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

Educational practice "Research work (obtaining primary skills of research work)" refers to the variable component of the mandatory part of block 2 of the curriculum.

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 the educational practice "Research Work (Obtaining Primary Skills of Research Work)".

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 / Research Work Technological Training / Technological Practice Undergraduate 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 / Research Work Technological Training / Technological Practice Undergraduate 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 / Research Work Technological Training / Technological Practice Undergraduate 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 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.	Foreign Language Russian as a Foreign Language Second Foreign Language (practical course) Professional Russian (as a foreign language) / Foreign Language in professional activities Professional Russian (as a foreign language) in professional activity Foreign Language in professional activities Business Communications	Research Work / Research Work Technological Training / Technological Practice Undergraduate Training State Final Certification

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
		Culture of Scientific and Business Speech	
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 / Research Work Technological Training / Technological Practice Undergraduate Training 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 / Research Work Technological Training / Technological Practice Undergraduate 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 / Research Work Technological Training / Technological Practice Undergraduate Training 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 / Research Work Technological Training / Technological Practice Undergraduate Training State Final Certification
GC-9	Able to use basic defectological knowledge in the social and professional spheres	Jurisprudence / Правоведение	Research Work Technological Training Undergraduate Training State Final Certification
GC-10	Able to make informed economic decisions in various areas of life	Jurisprudence / Правоведение	Research Work Technological Training Undergraduate Training 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 Technological Training Undergraduate Training State Final Certification
GC-12	Is able to: search for the necessary sources of information and data, perceive, analyze, remember and transmit	Jurisprudence / Правоведение	Research Work Technological Training Undergraduate Training State Final Certification

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
	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		
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 / Research Work Technological Training / Technological Practice Undergraduate 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 professional activity	Computer Science and Programming Space Flight Mechanics Automatic Control Theory	Research Work / Research Work Technological Training / Technological Practice Undergraduate Training State Final Certification
PC-1	Able to conduct computational experiments using standard software in order to obtain mathematical models of processes and objects of automation and control	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 Virtual and augmented reality technologies	Research Work / Research Work Technological Training / Technological Practice Undergraduate Training State Final Certification
PC-2	Able to participate in the preparation of analytical reviews and scientific and	Space Flight Mechanics	Research Work / Research Work Technological Training / Technological Practice

Cipher	Competency Name	Previous Disciplines/Modules, Practices*	Subsequent disciplines/modules, practices*
	technical reports on the results of the work performed, in the preparation of publications on the results of research and development		Undergraduate Training State Final Certification
PP-5	It is able to collect and analyze initial data for the calculation and design of automation and control systems and tools	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 / Research Work Technological Training / Technological Practice Undergraduate 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 labor intensity of the educational practice "Research work (obtaining primary skills of research work)" is 3 credits (108 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	2
	Safety briefing in the workplace (in the laboratory and/or in production)	2
Section 2. Research	Fulfillment of scientific tasks	34
	Execution of the instructions of the internship supervisor, collection and systematization of the material necessary for the implementation of an individual task, preparation and execution of the internship report.	34
	Current control of the internship by the supervisor	9
	Keeping an internship diary	9
Preparation of an internship report		9
Preparation for defense and defense of the internship report		9
	ALTOGETHER:	108

* - 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

Scientific and educational laboratories of the Department of Mechanics and Control Processes, in which students undergo internship:

Room with a list of logistics	Whereabouts
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

Educational practice "Research work (obtaining primary skills of research work)" can be carried out both in the structural divisions of RUDN University or in organizations of 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 for the Organization of Internships and Assistance to the Employment of Graduates at RUDN University.

8. EDUCATIONAL, METHODOLOGICAL AND INFORMATION SUPPORT OF PRACTICE

Reference citations:

1. Nefedov V.N., Osipova V.A. Kurs discretenoy matematiki: Ucheb. allowance. Moscow, MAI Publ., 1992.
2. Kuznetsov O.P., Adelson-Velsky G.M. Discrete mathematics for an engineer. Moscow, Energoatomizdat Publ., 1988.
3. Gurov V.V., ChGCanov V.O. Osnovy teorii i organizatsii EVM - Internet-universitet informatsionnykh tekhnologii - INTUIT.ru, 2006 - 280 p.
4. Cormen Thomas H., Lazerson Charles I., Rivest Ronald L., Stein Clifford Algorithms. Construction and analysis, 2nd edition – Moscow: Izd. Williams House, 2007. - 1296 p.
5. Knut Donald E. Iskusstvo programmirovanie v 3-kh tomakh [The Art of Programming in 3 Volumes]. Williams House, 2008. – T.1 – 720, T.2 – 832 p., T.3 – 824 p.

6. Aho Alfred V., Hopcroft John, Ullman Jeffrey D., Data Structures and Algorithms - - Moscow: Izd. Williams House, 2000. – 384 p.

7. MalyGC A.A., Pazizin S.V., Pogozhin N.S. Introduction to Information Protection in Automated Systems – Moscow: Hot Line-Telecom, 2001, 148 p.

8. Belov E.B., Los V.P., Meshcheryakov R.V., Shelupanov A.A. Osnovy informatsionnoy bezopasnosti [Fundamentals of information security]. Textbook for Higher Educational Institutions, Moscow: Goryachaya liniya – Telekom, 2006. - 544 p.

9. Tikhonov V.A., Raikh V.V. Informatsionnaya bezopasnost': kontseptual'nye, pravovye, organizatsionnye i tekhnicheskie aspekty [Information security: conceptual, legal, organizational and technical aspects]. allowance. – Moscow: Gelios ARV, 2006.- 528 p.

Further reading:

1. Informatics. Basic course. Simonovich S.V., St. Petersburg: Piter, 2011 – 640 p.;
2. Python for kids. Self-Study on Programming. Briggs D., Moscow: "Mann, Ivanov and Ferber", 2017 – 321 p.;
3. Programming in examples and problems. Gratsianova T.Y., Moscow: Laboratory of Knowledge, 2016 – 368 p.;
4. Programming in examples and problems. Gratsianova T.Y., Moscow: Laboratory of Knowledge, 2016 – 368 p.;
5. Moore T., Pym D., Ioannidis C., Economics of Information Security and Privacy, Springer, 2010, - 320 p.
6. Ensuring the Information Security of Business, Ed. Kurilo A.P., Alpina Publishers, 2011, - 392 p.Demidovich, E.M. Fundamentals of Algorithmization and Programming. SI Language: Textbook. St. Petersburg: BHV-Petersburg, 2006. – 438 p.
7. Samarsky A.A. Introduction to Numerical Methods. Moscow, NaGCa Publ., 1997.
8. Voevodin V.V., Kuznetsov Yu.A. Matrices and Calculations. Moscow, NaGCa Publ., 1984.
9. Ortega J., Poole U. Introduction to Numerical Methods for Solving Differential Equations. Moscow, NaGCa Publ., 1986.
10. Shildt, G. Polnyy spravochnik po S, 4-e izdaniya: - M.: Izdatel'skii dom «Williams», 2005. – 704 p.

Periodicals:

Domestic magazines: Automation and Telemechanics; Sensors and systems; Proceedings of Higher Educational Institutions. Instrumentation; Proceedings of Higher Educational Institutions. Applied Nonlinear Dynamics; Proceedings of Higher Educational Institutions. Problems of energy; Proceedings of the Russian Academy of Sciences. Theory and Control Systems; Information-measuring and control systems; Information Technology; Mathematical modeling; Mechatronics. Automation. Management; Non-linear world; Review of Applied and Industrial Mathematics; Devices and systems: "Control, Control, Diagnostics"; Applied Mathematics and Mechanics; Forecasting problems; Problems of Theory and Practice of Management; Management problems; Management Systems and Information Technology; Digital signal processing; Open systems; Neurocomputers: development, application.

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 educational practice "Research work (obtaining primary skills of research work)" (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 educational practice "Research work (obtaining primary skills of research work)" 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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HEAD OF THE BUP:

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