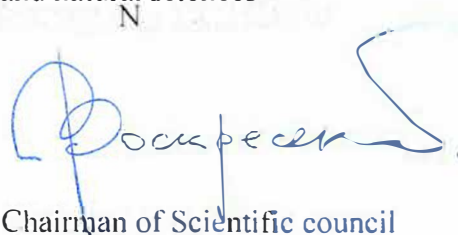


*Federal state autonomous educational institution of higher education
Peoples' Friendship University of Russia*

Faculty of physical, mathematical and natural sciences

Adopted by the Scientific council of
Faculty of physical, mathematical
and natural sciences

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Chairman of Scientific council

Program of research practice

Recommended for educational program
01.06.01 « Mathematics and mechanics»

Graduate's qualification: the Researcher. Teacher-researcher

All practices in this educational program are conducted in accordance with the Educational Standard of PFUR in the direction 01.06.01 " Mathematics and mechanics "(qualification (degree Researcher. Teacher-researcher) and "Regulations on the procedure for the practice of students in PFUR full-time, part-time and correspondence forms of education", approved by the order of the rector of April 22, 2014 № 268.

1. The purpose of the research practices

The purpose of the research practice of a graduate student is to acquire practical skills of independent research work, to collect material for writing a thesis and to verify the validity of the theoretical conclusions made in the final qualifying work.

Research practice – a type of educational work aimed at expanding and consolidating the theoretical and practical knowledge gained by graduate students in the learning process.

Also, the purpose of the postgraduate research practice is:

- * acquisition of practical skills of independent research work;
- * mastering the methodology and methodology of research work; consolidation of theoretical knowledge gained during classroom, practical, laboratory and research classes, as well as familiarizing the graduate student to the social environment in order to acquire social and personal competencies necessary for work in the professional sphere;
- * use of modern information technologies; acquisition of skills for obtaining, processing, storage and dissemination of scientific information; collection and analysis of data necessary for research.

2. Tasks of research practice

The objectives of the research practice are:

- * development of a set of skills for the implementation of scientific research for the preparation of a dissertation;
- * formation of skills of speeches at scientific conferences with presentation of research materials, participation in scientific discussions;
- * formation of skills of independent research in accordance with the developed program;
- * formation of the skill of presenting the results of the study in the form of an article, report;
- * familiarization with the program of research works of the organization (Department, laboratory, research Institute, Department) in which the practice is conducted;
- * mastering modern methods and methodology of scientific research; improving the skills of independent research
- * activities; accumulation of experience in scientific and analytical activities, as well as mastering the skills of presenting the results in the form of reports, publications, reports

3. The place of research practice in the structure of the Basic Educational Program

Research practice in the system of training of highly qualified personnel is a component of professional training for research activities in higher education and is a type of practical activity of graduate students in the implementation of scientific work in higher education, including research within the theme of their final qualifying work (candidate thesis), testing of the results and writing a PhD thesis.

Research practice for students in the basic educational programs (profiles) of graduate school in the direction 01.06.01 "Mathematics and mechanics" is part of the educational component provided by the curriculum, and the logical conclusion of research work.

For successful research work, a graduate student must have preliminary training in mathematics and mechanics, possess the initial skills of scientific research, be able to work inde-

pendently with the main information sources, select literature on a given topic, prepare abstract reviews on the topic of research.

Research practice in the system of training of highly qualified personnel is a component of professional training for research activities in higher education and is a type of practical activity of graduate students in the implementation of scientific work, including scientific research in the framework of their PhD dissertation, approbation of the results and writing a dissertation.

Knowledge, skills and abilities acquired by postgraduates during the passage of research practice are widely used in research activities, culminating in the writing of a dissertation.

4. Forms of research practice

The main form of research practice is research work.

The practice takes place within the framework of the execution of the curriculum of post-graduate training. At the end of the research practice, the graduate student defends the report on the work done. During the research practice, the main task of the student is to complete the research on the topic of the final qualifying work (Kandy-Danish thesis). To do this, the graduate student must faithfully carry out the instructions of the direct supervisor. The graduate student publishes scientific articles on the topic of scientific research in journals included in the list of Scopus, Web of Science, speaks at scientific conferences, seminars, round tables, prepares his PhD thesis.

5. The place and time of carrying out of research practice

Research practice of the graduate student is carried out in PFUR, academic or research organizations, industrial enterprises, specialized companies, etc. The place of practice is determined taking into account the theme of the final qualifying work (PhD thesis) of the student. It is carried out in the first, third and fourth year of study during all semesters.

6. Competence of the student, formed as a result of the passage of research practice

The process of studying the discipline is aimed at the formation of the following competencies:

Content of competence	Code competences
the ability to critical analysis and evaluation of modern scientific achievements, generating new ideas in solving research and practical problems, including inter-disciplinary fields	UC-1
the ability to design and carry out complex research, including interdisciplinary, on the basis of a holistic system of scientific worldview using knowledge in the field of history and philosophy of science	UC-2
willingness to participate in the work of Russian and international research teams to solve scientific and educational problems	UC-3
ability to plan and solve problems of own professional and personal development	UC-5
ability to independently carry out research activities in the relevant professional field using modern research methods and information and communication technologies	GPC-1

As a result of the research practice, the student develops professional competencies and the results of the practice, the graduate student must demonstrate the following results:

Know:

about the current state of science, the main directions of scientific research, priorities;

on the procedure for implementing the results of research and development.

the main scientific conferences at which the results of the dissertation research of a graduate student on the problems of dissertation research can be presented;

To be able to:

- to formulate the goals and objectives of scientific research; to choose and justify research methods;

- to work with modern scientific equipment at carrying out of scientific research;

- to draw up the results of scientific research (report, scientific article, abstracts).

Possess skills:

- work with applied scientific packages and editorial programs used in research and development;

- analysis, systematization and generalization of scientific and technical information on the research topic;

- analysis of the reliability of the results;

- analysis of the scientific and practical significance of the research, as well as technical and economic efficiency of the development;

- presentations and presentations at conferences and scientific seminars; to give meaningful answers to the questions of the conference participants, to participate in scientific discussions.

7. Structure and content of research practice

The total complexity of the practice is 59 credits, 2124 hours.

	The sections (phases) practices	Types of production work, including independent work and labor intensity (in hours)		Forms of current control
		Lab.	Indepen. work	
	1 year (1-2 sem.)			
	Preparatory	18	18	oral survey
	Main	54	180	differentiated credits
	Final	2	16	written report
	3 year (5-6 sem.)			
	Preparatory	18	18	oral survey
	Main	54	972	differentiated credits
	Final	2	16	written report
	4 year (7-8 sem.)			
	Preparatory	18	18	oral survey
	Main	54	648	differentiated credits
	Final	2	16	written report

Types of activities of postgraduates in the workplace

Stage 1 (preparatory):

1. An introductory lecture is held, where graduate students are introduced to the goals, objectives and content of research practice.
2. Graduate students receive advice on documentation.
3. The individual task on practice with the head of practice (the scientific head) is made.

Stage 2 (main):

1. Conducting an empirical study, the results of which are consistent with the theoretical development.
2. Publication of scientific articles of the graduate student on the topic of scientific research in journals included in the list SCOPUS, Web of Science, abstracts of conferences in the number approved by the University.
3. Preparation and discussion of the chapters of the final qualifying work (PhD thesis).
4. The graduate student is ready to start registration of the final qualifying work and its pre-defense within the block "State final certification".

Stage 3 (final):

1. Summing up the practice.
2. Synthesis of research results in reports, articles and reports.

Teachers analyze the activities of graduate students, note their difficulties and the most successful solutions to the tasks in the course of classes. The overall assessment for research practice consists of the degree of participation of the graduate student in the scientific life of the Department and the University, the level of research on the thesis and documentation.

8. Research and production technologies used in production practice

Information support of discipline:

Only licensed software installed in the PFUR is used:

- software package Microsoft Office;
- multimedia equipment and personal computers;
- full-text databases and resources which can be accessed from the network PFUR;

9. Training and methodological support independent work of graduate students during the period of research training

Independent work of the graduate student is carried out according to the individual plan developed by the graduate student and the supervisor approved according to the schedule of educational process by the corresponding Department.

Graduate students in their work use sources on the topic of their research. The graduate student is required to read the papers on the subject of his research, recommended him supervisor, scientists working in Universities and in other scientific and educational organizations, representing the main mathematical schools of the country. It is mandatory for a graduate student to familiarize himself with the works on the topic of his research published in international publications available through international (including electronic) library systems, access to which is provided by the PFUR.

The graduate student conducts research independently, avoiding plagiarism, as well as minimizing verbatim borrowing of previously published works. The practice involves familiarity with the work of dissertation councils: the study of normative materials regulating their activi-

ties; understanding the duties of the Chairman of the dissertation Council, his Deputy and scientific Secretary of the dissertation Council; familiarization with the rules of registration, submission to the defense and defense of dissertations.

In the process of passing research practice graduate student continues to work on a single topic of research Department, independently receiving experimental data. The theme of research practice coincides with the theme of the future scientific report.

The supervisor of the postgraduate student is appointed as the head of the practice. The head carries out General organizational measures and current control over the progress of the research practice. If necessary, in addition to the scientific supervisor, a scientific consultant – a researcher is appointed, who is in charge of the research facility, where the graduate student will receive experimental results during the internship.

Before the beginning of the internship, the head gives the graduate student a task for practice, which specifies the section of a single topic of research, which will be developed during the internship; experimental methodology; the amount of experimental data and the timing of each specific experiment; literary sources that need to be worked out by the graduate student during the internship.

10. Forms of intermediate certification (based on the results of research practice). Forms of evaluation tools based on the results of research practice.

According to the results of research practice at the end of each academic semester, the graduate student submits a detailed written report. The report includes General information (surname, name, patronymic of the graduate student; type of practice and place of its passage; theme of the final qualifying work (PhD thesis) ; period of practice), as well as information characterizing the content of the work of the graduate student and reflecting the implementation of the program of research practice.

The report should include information:

* on the individual task; on the preparation and publication of articles in journals;

* about participation of the graduate student in significant conferences on the topic of his research; about participation in the research work of the Department (with the participation of);

* on the degree of readiness of the final qualifying work (PhD thesis).

The report may be accompanied by documents that contain information about the results of the student's work during the period of research practice (for example, the texts of articles or reports prepared by the graduate student on the materials collected in practice).

The results of the practice of each type are determined by the intermediate certification with the assessment of "excellent", "good", "satisfactory", "unsatisfactory" and in the system of ESTS (A, B, C, E). The basis for their establishment is adopted at the University point-rating system.

Students who have passed practice in other educational organizations by the decision of the Department can be credited practice after submission of the relevant report on practice.

Student who have not executed internship program without good cause, received a negative opinion about the work or unsatisfactory mark protection with those of the report, the decision of the Dean in coordination with the corresponding Department may be privatise to practice again in their spare time or seems to Chisinau as not fulfilled obligations for bona fide development of the educational program and implementation of the curriculum.

Students who have not passed the practice of any kind for a good reason, practice on an individual plan.

11. Educational-methodical and information support of industrial practice

Independent work of the graduate student is carried out in accordance with the individual plan developed jointly with the supervisor.

The graduate student in his work uses sources on the topic of his scientific research. At the same time, the graduate student is obliged to familiarize himself with the works on the topic of his research recommended to him by the supervisor.

Databases, reference and search engines

1. <http://vak.ed.gov.ru>
2. Electronic library <http://www.rsl.ru/>
3. The website of the library PFUR <http://lib.rudn.ru/>
4. Science Direct <http://www.sciencedirect.com>
5. EBSCO <http://search.ebscohost.com>, Academic Search Premier
6. Oxford University Press <http://www3.oup.co.uk/jnls>. Journals in exact and technical Sciences.
7. Sage Publications <http://online.sagepub.com> .
8. Springer/Kluwer <http://www.springerlink.com>. Magazines and books publishing
9. Tailor & Francis <http://www.informaworld.com> . The collection of journals has more than 1000 titles in all fields of knowledge.
10. American Mathematical Society <http://www.ams.org/> Resource of the American mathematical society.
11. European Mathematical Society <http://www.euro-math-soc.eu/> Resource of the European mathematical society.
12. Portal to Mathematics Publications <http://www.emis.de/projects/EULER/>
13. Catalog of mathematical Internet resources <http://www.mathtree.ru/>
14. Zentralblatt MATH (zbMATH) <https://zbmath.org>
15. All-Russian mathematical portal mathnet.ru
16. Web of Science <http://www.isiknowledge.com>

Periodicals

Review of Modern Physics, Review of Modern Physics, Annual Review of Astronomy and Astrophysics, Annual Review of Biochemistry, Chemical Reviews Nature Physics, Annual Review of Condensed Matter Physics, Annals of Mathematics, Journal of the American Mathematical Society, Acta Mathematica, Communications on Pure and Applied Mathematics Swarm and Evolutionary Computation Geometric and Functional Analysis Formal Aspects of Computing, Discrete Mathematics, Theory of Computing Systems Reports on Progress in Physics New Journal of Physics.

12. Material and technical support of discipline:

Classrooms 495a, 398, 509 in the PFUR, Ordzhonikidze str., 3, group classrooms in the PFUR, Ordzhonikidze str., 3 on 3, 4 and 5 floors, master classes, laboratories (cl. 510 and 424).

13. Fund of assessment tools for carrying out the interim assessment of scientific research

FAT on discipline is presented in the Appendix to this program.

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