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**Federal State Autonomous Educational Institution of Higher Education  
Peoples' Friendship University of Russia  
RUDN University**

Educational division (faculty/institute/academy) as higher education programme developer

## **INTERNSHIP SYLLABUS**

Research work  
internship title

production  
internship type

**Recommended by the Didactic Council for the Education Field of:**

01.04.01 «Mathematics»  
field of studies / speciality code and title

**The student's internship is implemented within the professional education programme of higher education:**

Functional methods in differential equations and interdisciplinary research /  
Функциональные методы в дифференциальных уравнениях и  
междисциплинарных исследованиях (англ.)  
higher education programme profile/specialisation title

**2024**

## 1. INTERNSHIP GOAL(s)

The goal of the research work is to consolidate and deepen the theoretical training of the student and acquire practical skills and competencies in the field of his future professional activity. In particular, the goal of the research work is to acquire by the student the experience of both independent scientific work and the experience of working "in a team" (in a research team), the formation of general cultural, general professional and professional competencies in accordance with the educational standards of higher education of RUDN University.

## 2. REQUIREMENTS FOR LEARNING OUTCOMES

The research work implementation is aimed at the development of the following competences (competences in part):

*Table 2.1. List of competences that students acquire during the internship*

<b>Competence code</b>	<b>Competence descriptor</b>	<b>Competence formation indicators (within this course)</b>
<b>GC-6</b>	Ability to determine and implement the priorities of their own activities and ways to improve it based on self-assessment	GC-6.1. Evaluates his resources and their limits (personal, situational, temporary), uses them optimally for the successful completion of the assigned task
		GC-6.2. Determines priorities for professional growth and ways to improve their own activities based on self-assessment according to selected criteria
		GC-6.3. Builds a flexible professional trajectory using the tools of continuous education, taking into account the accumulated experience of professional activity and the dynamically changing requirements of the labor market
<b>PC-1</b>	Ability to conduct scientific research and obtain new scientific and applied results independently and as part of a scientific team	PC-1.1. Draws up a general research plan and detailed plans for individual stages
		PC-1.2. Selects experimental and computational-theoretical methods for solving the problem based on the available material and time resources
<b>PC-2</b>	Ability to develop and analyze conceptual and theoretical models of scientific problems and tasks to be solved	PC-2.1. Searches for specialized information in patent information databases
		PC-2.2. Analyzes and summarizes the results of a patent search on the subject of the project in the selected area of mathematics
<b>PC-3</b>	Ability to develop and apply mathematical methods, system and application software for solving problems of scientific and design and technological activities	PC-3.1. Systematizes information obtained in the course of research, analyzes it and compares it with literature data
		PC-3.2. Determines possible directions for the development of work and prospects for the practical application of the results obtained

### 3. INTERNSHIP IN HIGHER EDUCATION PROGRAMME STRUCTURE

The research work refers to the core component of (B2) block of the higher educational programme curriculum.

Within the higher education programme students also master other disciplines (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the research work.

*Table 3.1. The list of the higher education programme components that contribute to the achievement of the expected learning outcomes as the internship results.*

<b>Competence code</b>	<b>Competence descriptor</b>	<b>Previous courses/modules, internships*</b>	<b>Subsequent courses/modules, internships*</b>
<b>GC-6</b>	Ability to determine and implement the priorities of their own activities and ways to improve it based on self-assessment	History and methodology of mathematics	State Examination, Master Thesis Defence
<b>PC-1</b>	Ability to conduct scientific research and obtain new scientific and applied results independently and as part of a scientific team	Computer technologies in science and education, Modern problems of mathematics, Interdisciplinary term paper, Introduction to low-dimensional topology, Operators in function spaces, Non-Euclidean geometries and their applications, Pre-graduation practical training, Introduction to algebraic topology, Scientific seminar on functional spaces	State Examination, Master Thesis Defence
<b>PC-2</b>	Ability to develop and analyze conceptual and theoretical models of scientific problems and tasks to be solved	Computer technologies in science and education, Functional-differential equations and nonlocal boundary value problems, Interdisciplinary term paper, Pre-graduation practical training	State Examination, Master Thesis Defence
<b>PC-3</b>	Ability to develop and apply mathematical methods, system and application software for solving problems of scientific and design	Computer technologies in science and education, Functional-differential equations and nonlocal boundary value problems,	State Examination, Master Thesis Defence

Competence code	Competence descriptor	Previous courses/modules, internships*	Subsequent courses/modules, internships*
	and technological activities	Interdisciplinary term paper, Pre-graduation practical training	

\* To be filled in according with the competence matrix of the higher education programme.

#### 4. INTERNSHIP WORKLOAD

The total workload of the internship is 15 credits (540 academic hours).

#### 5. INTERNSHIP CONTENTS

*Table 5.1. Internship contents\**

Modules	Contents (topics, types of practical activities)	Workload, academic hours
Module 1. Organization of research work, preparatory stage	Meeting with the head of the practice: <ul style="list-style-type: none"> <li>• definition of goals and objectives of the research work;</li> <li>• registration of individual assignments of students for research work.</li> </ul>	6
Module 2. Research stage	<ul style="list-style-type: none"> <li>• Studying educational and scientific literature on the topics chosen at the previous stage;</li> <li>• Attending research seminars and participating as a speaker;</li> <li>• Consultations and joint scientific work with the supervisor;</li> <li>• Work in libraries and computer classes;</li> <li>• Conducting research as part of an individual assignment.</li> </ul>	516
Writing an internship report		9
Preparing for defence and defending the internship report		9
<b>TOTAL:</b>		<b>540</b>

\* The contents of internship through modules and types of practical activities shall be FULLY reflected in the student's internship report.

#### 6. INTERNSHIP EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

The infrastructure and technical support necessary for the internship implementation include: laboratories and classrooms of S.M. Nikolskii Mathematical institute and other educational departments of RUDN University.

## **7. INTERNSHIP LOCATION AND TIMELINE**

The research work can be carried out at the structural divisions of RUDN University or at Moscow-based organisations.

The internship at an external organisation (outside RUDN University) is legally arranged on the grounds of an appropriate agreement, which specifies the terms, place and conditions for an internship implementation at the organisation.

The period of the internship, as a rule, corresponds to the period indicated in the training calendar of the higher education programme. However, the period of the internship can be rescheduled upon the agreement with the Department of Educational Policy and the Department for the Organization of Internship and Employment of RUDN students.

## **8. RESOURCES RECOMMENDED FOR INTERNSHIP**

The list of basic and auxiliary resources necessary for the student to complete the internship is formed by the head of the internship. It is not possible to list all the variety of basic and additional literature in one, necessarily short, document.

### **Software**

TeX typing and layout package for mathematical texts (for example, MikTeX 2.9), modern MS Office and Open Office packages, modern applied mathematical, mathematical-statistical, econometric packages.

### **Internet resources**

To search for the necessary information, students can use the necessary Internet resources, in particular, the resources of the Information and Library Center of RUDN University.

## **9. ASSESSMENT TOOLKIT AND GRADING SYSTEM FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL AS INTERNSHIP RESULTS**

The assessment toolkit and the grading system\* to evaluate the level of competences (competences in part) formation as the internship results are specified in the Appendix to the internship syllabus.

\* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

**DEVELOPERS:**

**Assistant of Mathematical Institute**

position, educational department

**V.V. Akhlynina**

name and surname.

**Professor of Mathematical  
Institute**

position, educational department

**V.I. Burenkov**

name and surname.

**HEAD OF Educational Department:**

**Director of Mathematical Institute**

position, educational department

**A.B. Muravnik**

name and surname.

**HEAD OF  
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Professor of Mathematical Institute**

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