

Federal State Autonomous Educational Institution of Higher Education  
«RUDN University»

*Agrarian and Technological Institute*  
Recommended by ISSC

## **WORKING PROGRAM OF THE DISCIPLINE**

**Наименование дисциплины**

**Methodology of Scientific Research**

Recommended for the direction of training/specialty

35.06.01 «Agriculture»

**Program Profile 06.01.01 «General Agriculture, Crop Production», 06.01.05 «Selection  
and Seed Production of Agricultural Plants», 06.01.07 «Plant Protection»**

**PhD Program**

### 1. Goals and objectives of the discipline:

The purpose of teaching the discipline "Research Methodology" is to improve theoretical knowledge about the methodology and methods of research, as well as to develop the abilities and skills of conducting research and documenting its results.

The main objectives of the discipline are:

- formation of holistic theoretical ideas about the general methodology of scientific creativity;
- familiarization with the general requirements for scientific research, the basics of their planning, organization of implementation and execution;
- development of the ability to independently acquire with the help of information technologies and use new knowledge and skills in practice.

### 2. Place of discipline in the structure GPC BO:

The place of the discipline in the structures of the discipline "Methodology of scientific research" to the variable part of block 1 of the curriculum.

Table 1 shows the previous and subsequent disciplines aimed at the formation of discipline competencies in accordance with the competence matrix of GPC BO.

Table 1

Отформатировано: английский (США)

#### Prior and subsequent disciplines aimed at the formation of competencies

№	Code and name of competence	Preceding disciplines	Subsequent disciplines (groups of disciplines)
General cultural competences			
1	Ability to critically analyze and evaluate modern scientific achievements, generate new ideas when solving research and practical problems, including in interdisciplinary fields (UC-1)	Планирование эксперимента в агрономии	Precision farming
2	Ability to design and carry out complex research, including interdisciplinary, based on a holistic systemic scientific worldview using knowledge in the field of history and philosophy of science (UC-2)	Планирование эксперимента в агрономии	Precision farming
3	Willingness to participate in the work of Russian and international research teams to solve scientific and educational problems (UC-3)	Планирование эксперимента в агрономии	Precision farming

### 3. Requirements for the results of mastering the discipline:

The process of studying the discipline is aimed at the formation of the following competencies: Universal Competencies (UC):

- UC-1: the ability to critically analyze and evaluate modern scientific achievements, generate new ideas when solving research and practical problems, including in interdisciplinary fields

- UC-2: Ability to design and carry out complex research, including interdisciplinary, based on a holistic systemic scientific worldview using knowledge in the field of history and philosophy of science

UC-3: Willingness to participate in the work of Russian and international research teams to solve scientific and scientific and educational problems.

**The scope of the discipline and types of educational work**

The total workload of the course is 3 credit units.

Отформатировано: английский (США)

Type of educational work	Total hours	Semesters			
		1	2	3	4
<b>Classroom Lessons (Total)</b>	36	36			
Including:					
<i>Lectures</i>	24	24			
<i>Practical lessons (PL)</i>	12	12			
<i>Seminars (S)</i>					
<i>Laboratory work (LW)</i>					
<b>Independent work (Total)</b>	45	45			
Control	27	27			
Total work rendered	hrs units	108 3	108 3		

**5. Discipline content**

**5.1. Contents of discipline sections**

The name of the sections (topics) of the discipline	Summary of sections (topics) of the discipline
Fundamentals of Scientific Research	The essence and principles of scientific research; Classification and characteristics of scientific research methods; Search for scientific information, Internet databases, work with literary sources; Planning and conducting genetic research
Laboratory and scientific practice	Rules for writing protocols of experimental research; Working with measuring instruments; Methods for collecting information.
Research data analysis	Principles of collecting and storing information; The nature of genetic data; Database creation; Statistical methods for processing experimental data of biological research: statistical hypotheses and their verification, methods for comparing 2 samples, analysis of variance (one-way and multivariate), methods of multiple comparisons, correlation and regression, analysis of qualitative data; Sequencing data analysis and phylogenetic analyzes

Publication of scientific research results	General idea of a scientific publication; Types of scientific articles; Structure and stylistic features of scientific texts; Search for journals for publication; Citation of scientific articles; Domestic and foreign scientometric databases
Finding funding sources and writing a grant application	Types of funding for scientific work; Search for funding sources; Basic rules for writing an application for a grant, including an international grant.

## 5.2. Sections of disciplines and types of classes

№	The name of the discipline section	Lec.	Practicum	Lab work	Seminar	Control	Total Hours
1	Fundamentals of Scientific Resear	4	3		9	5	21
2	Laboratory and scientific practice	5	2		9	6	22
3	Research data analysis	5	3		9	6	23
4	Publication of scientific research results	5	2		9	5	21
5	Finding funding sources and writing a grant application	5	2		9	5	21
	TOTAL	24	12		45	27	108

## 6. Laboratory workshop (if available)

## 7. Practical lessons (seminars)

№	Practical lessons (seminars)	Labor intensity (hour.)
1.	Fundamentals of Scientific Research	4
2.	Laboratory and scientific practice	4
3	Research data analysis	4
4	Publication of scientific research results	4
5	Finding funding sources and writing a grant application	4
Total		20

## 8. Material and technical support of the discipline:

Classroom with a personal computer (laptop), multimedia projector, screen.  
Demonstration material on slides on discipline topics.

## 9. Information support of the discipline

### a) Software

Volume Licensing Program (Microsoft Subscription) Enrollment for Education Solutions (EES) No. 56278518 dated 04/23/2019 (renewed annually, the program is assigned a new number).

### b) databases, reference and search systems

1. EBS of RUDN University and third-party EBS to which students have access on the basis of concluded agreements:

- Electronic library system RUDN - EBS RUDN <http://lib.rudn.ru/MegaPro/Web>

- ЭБС «Университетская библиотека онлайн» <http://www.biblioclub.ru>
- ЭБС Юрайт <http://www.biblio-online.ru>
- ЭБС «Консультант студента» [www.studentlibrary.ru](http://www.studentlibrary.ru)
- ЭБС «Лань» <http://e.lanbook.com/>
- ТУИС: <http://esystem.pfur.ru/course/view.php?id=46>
- 2. Biological publications database:-
- Вестник РУДН:** режим доступа с территории РУДН и удаленно <http://journals.rudn.ru/>
- **Научная библиотека Elibrary.ru:** доступ по IP-адресам РУДН по адресу: <http://www.elibrary.ru/defaultx.asp>
- **ScienceDirect (ESD), «FreedomCollection», "Cell Press" ИД "Elsevier".** Есть удаленный доступ к базе данных, доступ по IP-адресам РУДН (или удаленно по индивидуальному логину и паролю).
- **Академия Google (англ. Google Scholar)** - бесплатная поисковая система по полным текстам научных публикаций всех форматов и дисциплин. Индексирует полные тексты научных публикаций. Режим доступа: <http://scholar.google.ru/>
- **Scopus** - наукометрическая база данных издательства ИД "Elsevier". Есть удаленный доступ к базе данных. Доступ по IP-адресам РУДН и удаленно по логину и паролю (Грант МОН). Режим доступа: <http://www.scopus.com/>
- **Web of Science.** Есть удаленный доступ к базе данных. Доступ на платформу осуществляется по IP-адресам РУДН или удаленно. Удаленный доступ к WOS активируется без вмешательства администратора после регистрации на платформе из РУДН <http://login.webofknowledge.com/>
- <http://www.biotechnolog.ru/>
- <http://www.cbio.ru/>
- <http://www.rusbiotech.ru/>
- <http://www.genetika.ru/journal/>
- <http://generative.ru/>
- <http://prostonauka.com/biotech>
- <http://thesaurus.rusnano.com/wiki/106/>

#### **10. Educational and methodological support of the discipline:**

##### a) Main literature:

1. Пивоев В. М. Философия и методология науки [Электронный ресурс]: учебное пособие / В. М. Пивоев. - 2-е изд. - Москва: Директ-Медиа, 2014. - 321 с.

##### б) additional literature:

1. Актуальные проблемы совершенствования учебной и научной деятельности в высшей школе [Текст]. - Казань: Изд-во Казан. ун-та, 2003. - 215с.
3. Ануфриев А. Ф. Научное исследование: курсовые, диплом. и дис. работы [Текст]: учеб. пособие. - М.: Ось-89, 2004. - 111с.
4. Клеандров М. И. Кандидатская диссертация юриста: первые шаги исследователя [Текст] / М. И. Клеандров. - 2-е изд., перераб. и доп. - М.: Академический правовой университет, 2004. - 191 с.

#### **11. Methodical instructions for students on mastering the discipline (module)**

Postgraduate students must observe discipline, come to classes on time, submit homework for testing, prepare for the test and control work provided for in the course, be active in the classroom. An important place in the educational process is occupied by the independent work of graduate students. To organize independent work on the course, modern information technologies are used: online complexes of educational and teaching materials (program, list of

recommended literature and information resources, tasks for self-control), free access to the Internet for working with databases. As part of independent work, students prepare a patent application or a Scopus / WoS article.

Semester's work

Job type	Number of tasks	No. of points	Total points
Writing a review article	1	50	50
Seminar work, homework, presentation	6	5	30
Final certification (exam)	1	20	20
TOTAL (maximum points)			100

**Features of the implementation of discipline for people with disabilities and people with disabilities.** Training in the discipline of disabled people and persons with disabilities (hereinafter HIA) is carried out by the teacher, considering the characteristics of psychophysical development, individual capabilities and health status of such students. For students with musculoskeletal disorders and hearing disabilities, lectures will be accompanied by multimedia tools and handouts.

For students with visual disabilities, the use of technical means for enhancing residual vision is provided, and the possibility of developing audio materials is also provided. In this discipline, training for disabled people and people with disabilities can be carried out both in the classroom and remotely using the capabilities of the electronic educational environment (TUIS) and e-mail.

In the course of classroom training, various means of interactive learning are used, including group discussions, brainstorming, business games, project work in small groups, which makes it possible to include all participants in the educational process in active work on mastering the discipline. Such teaching methods are aimed at teamwork, discussion, group decision-making, contribute to group cohesion and provide opportunities for communication not only with the teacher, but also with other students, cooperation in the process of cognitive activity. Training of disabled people and persons with disabilities can be carried out according to an approved individual schedule, taking into account the characteristics of their psychophysical development and health status, which implies the individualization of the content, methods, pace of the student's learning activity, the ability to follow the specific actions of the student when solving specific problems, making the need, the required adjustments in the training process.

It provides for individual consultations (including counseling via e-mail), the provision of additional educational and methodological materials (depending on the diagnosis).

**12. Fund of assessment tools for intermediate certification of students by discipline (module)**

Materials for assessing the level of mastering the educational material of the discipline "Modern methods of diagnostics of pests" (evaluation materials), including a list of competencies indicating the stages of their formation, description of indicators and criteria for assessing competencies at various stages of their formation, description of assessment scales, standard control tasks or other materials necessary for assessing knowledge, skills, skills and (or) experience of activity, characterizing the stages of the formation of competencies in the process of mastering the educational program, methodological materials that determine the procedures for assessing knowledge, skills, skills and (or) experience of activities that characterize the stages of formation competencies are developed in full and are available for students on the discipline page at TUIS RUDN. The program was drawn up in accordance with the requirements of RUDN University.

Director of Agrobiotechnology Department



E.N. Pakina