

*Federal State Autonomous Educational Institution of Higher Education "Peoples'
Friendship University of Russia"
Agrarian and Technological institute*

Recommended ISSC / ME

THE WORKING PROGRAM OF THE DISCIPLINE

The name of the discipline **METHODOLOGY OF SCIENTIFIC RESEARCH**

Recommended for direction of training/specialties

06.06.01 "Biological Sciences"

(the code and name of the direction of training / specialty are indicated)

Focus of the program (profile)

03.02.07 Genetics

(name of the educational program in accordance with the direction (profile))

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 of EP VO:

Discipline "Research Methodology" 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 EP HE.

Table No. 1

Prior and subsequent disciplines aimed at the formation of competencies

P / p No.	Code and name of competence	Preceding disciplines	Subsequent disciplines (groups of disciplines)
Universal 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)	Plant genetics	<ul style="list-style-type: none">• Genetic bases of plant immunity Molecular and biochemical markers• Plant breeding and biotechnology
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)		
3	Willingness to participate in the work of Russian and international research teams to solve scientific and scientific and educational problems (UC-3)		

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):

- UK-1: the ability to critically analyze and evaluate modern scientific achievements, generate new ideas when solving research and practical problems, including in interdisciplinary fields
- UK-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
- UK-3: Willingness to participate in the work of Russian and international research teams to solve scientific and scientific and educational problems

4. Scope of discipline and types of educational work

The total workload of the course is 3 credit units.

Type of educational work	Total hours	Semesters			
		1	2	3	4
Classroom lessons (total)	60		60		
Including:					
Lectures	20		20		
Practical lessons (PZ)	20		20		
Seminars (C)					
Laboratory work (LR)					
Independent work (total)	68		68		
Total labor intensity hour credits units	108		108		
	3		3		

5. Content of the discipline

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 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

P / p No.	The name of the discipline section	Lecture	Practice.	Lab.	Semin	Ind. work	Total
1	Fundamentals of Scientific Research	5	4			5	14
2	Laboratory and scientific practice	10	4			10	24
3	Research data analysis	10	4			10	24
4	Publication of scientific research results	10	4			10	24
5	Finding funding sources and writing a grant application	5	4			5	14
TOTAL		40	20			40	100

6. Laboratory workshop (in the presence of)

7. Practical exercises (seminars)

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

8. Material and technical support of the discipline:

Classroom with 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>
- EBS "University Library Online" <http://www.biblioclub.ru>
- EBS Yurayt <http://www.biblio-online.ru>
- EBS "Student Consultant" www.studentlibrary.ru
- EBS "Doe" <http://e.lanbook.com/>
- TUIS: <http://esystem.pfur.ru/course/view.php?id=46>

2. Database of biological publications:

- **Bulletin of RUDN University**: access mode from the territory of RUDN University and remotely <http://journals.rudn.ru/>
- **Scientific library Elibrary.ru**: access by IP-addresses of RUDN University at the address: <http://www.elibrary.ru/defaultx.asp>
- **ScienceDirect (ESD), "FreedomCollection", "Cell Press" ID "Elsevier"**. There is remote access to the database, access by IP-addresses of RUDN University (or remotely by individual login and password).
- **Google Academy (eng. Google Scholar)** - free search engine for full texts of scientific publications of all formats and disciplines. Indexes full texts of scientific publications. Access mode: <https://scholar.google.ru/>
- **Scopus** - scientometric database of publishing house "Elsevier". There is remote access to the database. Access by IP-addresses of RUDN University and remotely by login and password (Grant of the Ministry of Education and Science). Access mode: <http://www.scopus.com/>
- **Web of Science**. There is remote access to the database. Access to the platform is carried out by IP-addresses of the RUDN University or remotely. Remote access to WOS is activated without administrator intervention after registering on the platform from RUDN University <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. Pivoev VM Philosophy and methodology of science [Electronic resource]: tutorial / VM Pivoev. - 2nd ed. - Moscow: Direct-Media, 2014. -- 321 p.

b) additional literature:

1. Actual problems of improving educational and scientific activities in higher education [Text]. - Kazan: Kazan Publishing House. University, 2003. -- 215s.

3. Anufriev AF Scientific research: coursework, diploma. and dis. work [Text]: textbook. allowance. - M.: Os-89, 2004.-- 111p.

4. Kleandrov MI Candidate dissertation of a lawyer: the first steps of a researcher [Text] / MI Kleandrov. - 2nd ed., Rev. and add. - M.: Academic Law University, 2004.-- 191 p.

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

Postgraduate students must observe discipline, come to class 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 Scopes / WoS article.

Semester work			
Job type	Number of tasks	Number of points	Points total
Writing a review article	1	50	50
Seminar work, homework, presentation	6	5	30
Final certification (exam)	1	20	20
TOTAL (maximum score)			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, taking into account 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 of disabled people and persons 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.

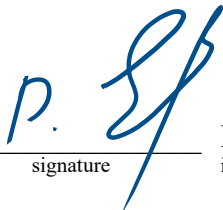
It provides for individual consultations (including counseling via e-mail), the provision of additional educational and methodological materials (depending on the diagnosis).

12. Fund of assessment tools for intermediate certification of students in the discipline (module)


Materials for assessing the level of mastering the educational material of the discipline (evaluation materials), including a list of competencies indicating the stages of their formation, a description of indicators and criteria for assessing competencies at various stages of their formation, a description of the assessment scales, typical control tasks or other materials necessary for the assessment of knowledge, abilities, 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 of competencies, developed in full and available for students on the discipline page at TUIS RUDN.

Developers:

Associate Professor of the Department
of Agrobiotechnology
position, department name


signature E.V. Romanova
initials, surname

Director of the Department
of Agrobiotechnology
position, department name


signature E. N. Pakina
initials, surname

Program manager

Associate Professor of the Department
of Agrobiotechnology
position, department name


signature E.V. Romanova
initials, surname