

MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
 Federal State Autonomous Educational Institution of
 Higher Education
 "Ural Federal University named after the First President of Russia B.N. Yeltsin"

Institute of Natural Sciences and Mathematics

APPROVED BY
 Vice-Rector for Research
 A.V. Germanenko
 2023 г.



PROGRAM OF THE DISCIPLINE
Research practice

List of information about the program of the discipline	Credentials
Postgraduate Program Biotechnology	Code PP 1.5.6.
Group of specialties Biological Sciences	Code 1.5.
Federal State requirements (FSR)	Order of the Ministry of Science and Higher Education of the Russian Federation № 951 dated 20.10.2021.
Self-approved requirements (SAR)	Order "On the implementation of the "Requirements for the development and implementation of training programs for scientific and scientific-pedagogical personnel in the graduate school of UrFU" dated 31.03.2022 №315/03

Yekaterinburg
 2023

The program of the Research practice was compiled by the authors:

№	Full name	Academic degree, Academic title	Position	Affiliation
1	Galina G. Borisova	Dr. Sci., Senior Researcher	Professor	Department of Experimental Biology and Biotechnology of the Institute of Natural Sciences and Mathematics
2	Alexander A. Ermoshin	PhD, Docent	Associate Professor	Department of Experimental Biology and Biotechnology of the Institute of Natural Sciences and Mathematics
3	Irina S. Kiseleva	PhD, Docent	Head of Department	Department of Experimental Biology and Biotechnology of the Institute of Natural Sciences and Mathematics
4	Maria V. Ulitko	PhD	Associate Professor	Department of Biology and Fundamental Medicine of the Institute of Natural Sciences and Mathematics

Recommended by:

Educational and methodological board of Institute of Natural Sciences and Mathematics

Head of the Educational and Methodological board of
the Institute of Natural Sciences and Mathematics
Record № 1 or 19.01.2023 г.


E. S. Buyanova

Agreed by:

Head of academic staff training department


E.A. Butrina

1. GENERAL CHARACTERISTICS OF THE RESEARCH PRACTICE

1.1. Annotation

The purpose of the discipline: to consolidate and deepen the theoretical knowledge of PhD students obtained in the study of disciplines, as well as the acquisition of research skills.

The content of the research practice of a PhD student is determined taking into account the interests and capabilities of the department where it is carried out, and is completely determined by an individual task. The list of questions that PhD students study and perform in practice, their detail and depth of study, as well as the nature of individual tasks are determined by the head of the practice.

The main objectives of the research practice are:

- development of practical skills and abilities of scientific activity;
- strengthening motivation for scientific work;
- mastering the methodology of research in the field of biotechnology;
- formation of the skills necessary for a scientific worker to successfully perform his functions;
- formation of skills for creative solution of scientific and research and production problems.

1.2. The language of study – English.

1.3. Expected discipline outcomes

As a result of mastering the discipline, a PhD student should:

Know:

- the main achievements and trends in the development of biotechnologies and their relationship with other sciences;
- real problems and tasks in the field of biotechnology, solved by the scientific teams of the university;
- major scientific journals publishing articles on biotechnology;
- principles of organization of scientific activity, its legal and regulatory framework in a higher educational institution, the structure of scientific departments in higher education;
- the procedure for implementing the main provisions and requirements of documents regulating the activities of the university, department, teaching staff to improve scientific work.

Be able to:

- use technologies, methods and techniques for conducting scientific research;
- work on equipment and devices used in biotechnology;
- to apply modern information technologies in scientific activity;
- compare the results of their own research with the data of other researchers;
- use the skills of their own scientific research and research materials to improve educational activities;
- analyze the reasons for successes and failures in scientific activities, adjust their scientific activities.

Demonstrate skills and experience in:

- methods used in scientific research in the field of biotechnology;
- methods of oral and written scientific speech;
- skills of registration of results of scientific researches;
- methodology and technology of scientific research;
- methodology of self-assessment and self-analysis of the results and effectiveness of scientific research.

1.4. Practice base

The base of the research practice is FSAEI HE “Ural Federal University named after I.I. the first President of Russia B.N. Yeltsin. The organizer of the research practice is the department of the Institute of Natural Sciences and Mathematics or the Institute of Chemical Technology, to which the postgraduate student is assigned. If necessary, a graduate student can undergo research practice at other departments of similar topics, especially if the scientific interests of the department and the topics of the graduate student's research work coincide.

During the period of practice, the postgraduate student obeys all internal regulations, observes the requirements of labor protection and safety regulations established at the university.

The general management of scientific practice and scientific and methodological consulting is carried out by the supervisor and/or head of the practice.

1.5. The structure of practices, terms and duration

№ п/ п	Type of practice	Academic semester number	Scope of Practice	
			weeks	credits
1.	Research practice	2	2	3
Total			2	3

1.6. Scope of Practice

№ п/п	Types of educational work	Scope of discipline		The distribution of the hours in the 2 semester (hours)
		Total hours	Incl. contact work (hour)	
1.	Self-work of graduate students, including all types of current attestation	108		108
2.	Intermediate attestation	Test	0.25	Test, 4
3.	Total volume according to the curriculum, hour.	108		108
4.	Total volume according to the curriculum, credits	3		3

2. CONTENT OF DISCIPLINE

#	Topic	Content
P1	Organizational aspects of scientific activity	Organization of scientific activity in the education system of the Russian Federation and UrFU. Legal and normative bases of scientific activity. Directions of scientific activity of the university in the field of biotechnology: history and current state. UrFU Scientific Schools in the field of Biological Sciences, Biotechnology and related fields of science. Drawing up an individual plan for research practice.
P2	Oral and written scientific speech	The specifics of oral speech at scientific seminars, conferences, etc. The specifics of written scientific speech in the preparation of reports, articles, abstracts, presentations, monographs, popular science texts, etc.
P3	Practical aspects of scientific work	Participation in scientific seminars and other scientific meetings. Mastering the methods and techniques of working on scientific equipment in accordance with the scientific direction of the postgraduate student. Development of a research plan, selection of adequate research methods and techniques on the topic of dissertation work. Preparing for an internship report.

3. ORGANIZATION OF PRACTICAL EXERCISES, INDEPENDENT WORK ON THE DISCIPLINE

3.1. Approximate plan of self-study work

List of tasks for self-study work	Scope of the discipline	
	hours	credits
Organization of scientific activity in the Russian Federation, including in universities. Organization of scientific research in UrFU.	2	
Directions of scientific activity of the university in the field of biotechnology: history and current state. UrFU Scientific Schools in the field of Biological Sciences, Biotechnology and related fields of science.	2	
Drawing up an individual plan for research practice	2	
Preparation of oral presentations, reports, presentations for scientific seminars, conferences, etc.	12	
Preparation of scientific reports, articles, abstracts of reports, popular science texts, etc.	12	
Participation in scientific seminars, conferences and other scientific meetings	12	
Organizing and holding scientific meetings online using various services	8	
Studying the legal and regulatory framework for scientific activity	2	
Development of a research plan, selection of adequate research methods and techniques on the topic of dissertation work.	4	
Mastering the methods and techniques of working on scientific equipment in accordance with the scientific direction of the postgraduate student.	30	
Performing research in accordance with the practice program	20	
Preparing for a report on research practice	2	
In total	108	3

4. THE SET OF TOOLS FOR INTERMEDIATE AND FINAL ATTESTATION

4.1. The evaluation criteria for the results of current and intermediate attestation

Approved evaluation criteria of the achievements are based on three levels of mastering the competence components: intermediate, advanced, and high.

Competence components	Characteristics of the level of development the components of competencies		
	threshold	advanced	high
Knowledge	A PhD student demonstrates knowledge-acquaintance, knowledge-copy: he recognizes objects, phenomena and concepts, finds differences in them, knows of the sources of information, can independently reproduce knowledge.	A PhD student demonstrates analytical knowledge: confidently reproduces and understands the acquired knowledge, classifies them into one or another classification group, independently systematizes them, establishes relationships between them, productively applies in common situation.	A PhD student can independently get new knowledge from the world around him, creatively use it to make decisions in new and non-standard situations.

Skills	A PhD student is able to correctly perform prescribed actions according to an instruction, an algorithm in a known situation, independently solve typical problems that require a choice from known methods in a predictably changing situation	A PhD student is able to independently solve non-standard tasks that require a choice based on a combination of known methods in an unpredictably changing situation	A PhD student is able to independently solve research problems, demonstrates the creative use of skills (technologies)
Personal qualities	A PhD student has a low motivation for studying, shows an indifferent, irresponsible attitude to learning, and assigned work	A PhD student has a pronounced motivation for studying, demonstrates a positive attitude towards learning and future work, and is active.	A PhD student has a developed motivation for studying and work activities, shows perseverance and dedication, diligence, independence, and creativity.

4.2. Evaluation tools for current and intermediate certification

The final document is a written report of the postgraduate student, which should reflect the sections in accordance with the practice program and the presentation of the results of the practice at a meeting of the department in the form of a report.

In the report, the graduate student must reflect the results of the research. If necessary, the report is compiled taking into account the requirements for the design of materials marked "secret" or "for official use". As a rule, such materials should not be included in the report.

Attestation of a graduate student based on the results of practice is carried out by the department where he underwent research practice, based on the provision of a review by the head. A graduate student who has not completed the internship program, or who has received an unsatisfactory grade during the defense of the report, is sent to practice again during the holidays.

5. EDUCATIONAL AND INFORMATION SUPPORT OF DISCIPLINES

5.1. Recommended literature

5.1.1. Main literature

1. Dunleavy, P. *Authoring a PhD: How to Plan, Draft, Write and Finish a Doctoral Thesis or Dissertation*. Red Globe Press: 2003; p 297.
2. Tamhane, A. C. *Statistical Analysis of Designed Experiments: Theory and Applications*. 1 ed.; Wiley- Interscience: 2009; p 720.

5.1.2. Additional literature

1. Booth, W. C.; Colomb, G. G.; Williams, J. M.; Bizup, J.; Fitzgerald, W. T. *The Craft of Research*. 4 ed.; University of Chicago Press: 2016; p 336.
2. Thomas, G. *How to Do Your Research Project: A Guide for Students*. 4 ed.; SAGE Publications Ltd: 2022; p 368.
3. Silvia, P. J. *How to Write a Lot: A Practical Guide to Productive Academic Writing*. 2 ed.; American Psychological Association: 2018; p 110.
4. Bright Wilson Jr., E. *An Introduction to Scientific Research*. Dover Publications: 1991; p 400.
- 5.
6. Schimel, J. *Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded*. Oxford University Press: 2011; p 221.
7. McCarthy, P.; Hatcher, C. *Presentation Skills: The Essential Guide for Students (Study Skills)*. 1 ed.; SAGE Publications Ltd: 2002; p 228.
8. Morgan, S.; Whitener, B. *Speaking about Science: A Manual for Creating Clear Presentations* led.; Cambridge University Press: 2006; p 138.

5.2. Methodological developments

Not provided

5.3. Software

1. Microsoft office (Word, Excel, Power point);
2. Adobe Reader.
3. Software package for scientific research MATCAD.
4. CorelDraw X5
5. Chem office 2010 (ChemDraw, Chem3D)
6. Blast
7. Clustal

5.4. Databases, information and reference and search systems

1. ScienceDirect: <http://www.sciencedirect.com>;
2. Web of Science: <http://apps.webofknowledge.com>;
3. Scopus: <http://www.scopus.com>;
4. Reaxys: <http://reaxys.com>;
5. Search engine EBSCO Discovery Service <http://lib.urfu.ru/course/view.php?id=141>;
6. Federal Institute of Industrial Property <http://www1.fips.ru>;
7. Intelligent search engine Nigma RF (Нигма.РФ). access mode: <http://www.nigma.ru>.
8. www.ncbi
9. PubMed

5.5. Electronic educational resources

1. Zonal Science Library <http://lib.urfu.ru>;
2. Library catalogs <http://lib.urfu.ru/course/view.php?id=76>;
3. Digital catalogue <http://opac.urfu.ru>;
4. Electronic library systems <http://lib.urfu.ru/mod/resource/view.php?id=2330>;
5. Electronic resources of free access <http://lib.urfu.ru/course/view.php?id=75>;
6. Electronic resources by subscription <http://lib.urfu.ru/mod/data/view.php?id=1379>.

6. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE

6.1 Information about the equipment of the discipline with specialized and laboratory equipment

Ural Federal University has special rooms for lecture-type classes, group and individual consultations, current control and intermediate certification, as well as rooms for independent work, equipped with computer equipment with the ability to connect to the Internet and provide access to electronic information educational environment, and facilities for storage and preventive maintenance of equipment. Postgraduate students of the departments are provided with special laboratory facilities for research work.