

МИНОБРНАУКИ РОССИИ

**Федеральное государственное автономное образовательное
учреждение высшего образования "Пермский
государственный национальный исследовательский
университет"**

Кафедра биогеоценологии и охраны природы

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Программа учебной практики

RESEARCH WORK

Код УМК 95073

Утверждено
Протокол №8
от «17» мая 2021 г.

Пермь, 2021

1. Вид практики, способ и форма проведения практики

Вид практики **учебная**

Тип практики **научно-исследовательская работа (получение первичных навыков научно-исследовательской работы)**

Способ проведения практики **стационарная, выездная**

Форма (формы) проведения практики **дискретная**

2. Место практики в структуре образовательной программы

Учебная практика « Research work » входит в обязательную часть Блока « Б.2 » образовательной программы по направлениям подготовки (специальностям):

Направление: **05.03.06** Экология и природопользование
направленность Экологическая инженерия и новая энергетика

Цель практики :

Providing high-quality training for competitive, highly qualified bachelors who are ready for research and professional activities and have professional competencies in the field of ecology and nature management.

Задачи практики :

1. Determine the area of scientific research and analyze the state of the issue in the subject area under study.
2. Develop research methodology.
3. Conduct experimental research, processing and analysis of the obtained data using modern information technologies.
4. To develop the ability to critically analyze the results of their own research and literature data, readiness for professional self-improvement and development of creative potential, professional skills and professional ethics.

3. Перечень планируемых результатов обучения

В результате прохождения практики **Research work** у обучающегося должны быть сформированы следующие компетенции:

05.03.06 Экология и природопользование (направленность : Экологическая инженерия и новая энергетика)

ПК.1 Способен осуществлять выполнение экспериментов и оформление результатов исследований и разработок

Индикаторы

ПК.1.1 Постановка, планирование и решение научно-исследовательских задач по закрепленной тематике

ПК.1.2 Использует в профессиональной деятельности экспериментальные и полевые методы научного исследования

ПК.1.3 Анализирует, интерпретирует, обобщает полученные научные данные, представляет в виде отчетов, обзоров, научных работ

4. Содержание и объем практики, формы отчетности

| | |
|---|---|
| Направление подготовки | 05.03.06 Экология и природопользование (направленность: Экологическая инженерия и новая энергетика) |
| форма обучения | очная |
| №№ триместров, выделенных для прохождения практики | 6 |
| Объем практики (з.е.) | 3 |
| Объем практики (ак.час.) | 108 |
| Форма отчетности | Экзамен (6 триместр) |

Примерный график прохождения практики

| Количество часов | Содержание работ | Место проведения |
|--|--|---|
| Research work | | |
| 108 | <p>The discipline of research work is a mandatory section of the main educational program of the bachelor's degree and is aimed at the formation of professional competencies in the field of ecology and nature management.</p> <p>The forms of practical training for persons with disabilities are determined taking into account the peculiarities of psychophysiological development, individual capabilities and the state of health of students.</p> <p>There may be changes in the time frame for passing the current interim certification, namely, an increase in the time for preparing and submitting the practice report is provided.</p> | <p>PSU, Faculty of Geography, Department of Biogeocenology and Nature Protection</p> <p>For students with disabilities and disabilities, alternative places of practice are provided, individually provided, taking into account the recommendations of the psychological, medical and pedagogical commission or the ITU.</p> |
| Definition of the area of scientific research and analysis of the state of the issue in the subject area under study | | |
| 16 | Study of monographic and periodical publications on the current research topic | <p>PSU, Faculty of Geography, Department of Biogeocenology and Nature Protection</p> <p>For students with disabilities and disabilities, alternative places of practice are provided, individually provided, taking into account the recommendations of the psychological, medical and pedagogical commission or the ITU.</p> |
| Systematization of literature data on the subject of the study | | |

| Количество часов | Содержание работ | Место проведения |
|--|--|--|
| 38 | Writing a literary review on the subject of your research. | PSU, Faculty of Geography, Department of Biogeocenology and Nature Protection For students with disabilities and disabilities, alternative places of practice are provided, individually provided, taking into account the recommendations of the psychological, medical and pedagogical commission or the ITU. |
| Research part | | |
| 30 | Conducting their own research to expand and study the topic of scientific research in more depth. | PSU, Faculty of Geography, Department of Biogeocenology and Nature Protection For students with disabilities and disabilities, alternative places of practice are provided, individually provided, taking into account the recommendations of the psychological, medical and pedagogical commission or the ITU. |
| Design and presentation of the results of research work | | |
| 24 | The student draws up a report on the research work in accordance with the rules and requirements approved by the department. | PSU, Faculty of Geography, Department of Biogeocenology and Nature Protection For students with disabilities and disabilities, alternative places of practice are provided, individually provided, taking into account the recommendations of the psychological, medical and pedagogical commission or the ITU. |

5. Перечень учебной литературы, необходимой для проведения практики

Основная

1. Robert Fletcher, Marie-José Fortin "Spatial Ecology and Conservation Modeling Applications with R" ISBN 978-3-030-01989 - [Электронный ресурс] URL: <https://link.springer.com/book/10.1007/978-3-030-01989-1#about> <https://link.springer.com/book/10.1007/978-3-030-01989-1>
2. Massenov, K. B. Industrial ecology : the monograph / K. B. Massenov, E. T. Abseitov. — Алматы : Нур-Принт, 2016. — 398 с. — ISBN 978-601-238-541-0. — Текст : электронный // Электронно-библиотечная система IPR BOOKS : [сайт]. <https://www.iprbookshop.ru/69045>
3. Dietland Muller-Schwarze. Hands-On Chemical Ecology. Simple Field and Laboratory Exercises. Springer-Verlag New York 2009. Online ISBN 978-1-4419-0378-5. Текст электронный: // <https://link.springer.com/book/10.1007/978-1-4419-0378-5> <https://link.springer.com/book/10.1007/978-1-4419-0378-5>

Дополнительная

1. Robert C. Brears. Natural Resource Management and the Circular Economy. Palgrave Macmillan, Cham, 2018. ISBN 978-3-319-71888-0 [Электронный ресурс] <https://link.springer.com/book/10.1007/978-3-319-71888-0>
2. Tanay Sidki Uyar. Towards 100% Renewable Energy. Techniques, Costs and Regional Case-Studies. Springer International Publishing Switzerland 2017. Online ISBN 978-3-319-45659-1. Текст электронный: // <https://link.springer.com/book/10.1007/978-3-319-45659-1> <https://link.springer.com/book/10.1007/978-3-319-45659-1>
3. Martin Kaltschmitt, Wolfgang Streicher, Andreas Wiese. Renewable Energy. Technology, and Environment Economics. Springer-Verlag Berlin Heidelberg 2007. Online ISBN 978-3-540-70949-7. Текст электронный: // <https://link.springer.com/book/10.1007/3-540-70949-5> <https://link.springer.com/book/10.1007/3-540-70949-5>

6. Перечень ресурсов сети «Интернет», требуемых для проведения практики

При прохождении практики требуется использование следующих ресурсов сети «Интернет» :

http://elib.bsu.by/bitstream/123456789/41063/1/%D0%9A%D1%83%D1%80%D1%81%20%D0%BB%D0%B5%D0%BA%D1%86%D0%B8%D0%B9%20_%D0%9C%D0%B5%D1%82%D0%BE%D0%B4%D1%8B%20%D0%B3%D0%B5%D0%BE%D1%8D%D0%BA%D0%BE%D0%BB%D0%BE%D0%B3%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0 Methods of geocological research

https://priroda.permkrai.ru/environment-control/docs_uoos/ Regulatory framework in the area of environmental policy and environmental protection

<https://priroda.permkrai.ru/> Ministry of Natural Resources, Forestry and Ecology of the Perm Region

7. Перечень информационных технологий, используемых при проведении практики

Образовательный процесс по практике **Research work** предполагает использование следующего программного обеспечения и информационных справочных систем:

Presentation materials (slides on the topics of lectures and practical classes); on-line access to the Electronic Library System (ELS); access to the electronic information and educational environment of the university.

Internet services and electronic resources (search engines, e-mail, professional thematic chats and forums, audio and video conference systems, online encyclopedias, etc.)

Office application package "LibreOffice". Programs, demonstrations of video materials (player).

Software for the laptop: OS "Alt Education" (Contract No. DS 003-2020).

При освоении материала и выполнения заданий по дисциплине рекомендуется использование материалов, размещенных в Личных кабинетах обучающихся ЕТИС ПГНИУ (student.psu.ru).

При организации дистанционной работы и проведении занятий в режиме онлайн могут использоваться:

система видеоконференцсвязи на основе платформы BigBlueButton (<https://bigbluebutton.org/>).

система LMS Moodle (<http://e-learn.psu.ru/>), которая поддерживает возможность использования текстовых материалов и презентаций, аудио- и видеоконтент, а так же тесты, проверяемые задания, задания для совместной работы.

8. Описание материально-технической базы, необходимой для проведения практики

система тестирования Moodle (<http://e-learn.psu.ru/>).

For conducting seminars (practical) classes, for conducting group and individual consultations and intermediate certification-an audience equipped with presentation equipment (projector, screen, laptop) with the appropriate software.

Independent work: An audience for independent work, equipped with computer equipment with the ability to connect to the Internet, provided with access to the electronic information and educational environment of the university.

Premises of the Scientific Library of PSU.

For field practices - equipment provided by the organization.

Помещения научной библиотеки ПГНИУ для обеспечения самостоятельной работы обучающихся:

1. Научно-библиографический отдел, корп.1, ауд. 142. Оборудован 3 персональными компьютера с доступом к локальной и глобальной компьютерным сетям.

2. Читальный зал гуманитарной литературы, корп. 2, ауд. 418. Оборудован 7 персональными компьютерами с доступом к локальной и глобальной компьютерным сетям.

3. Читальный зал естественной литературы, корп.6, ауд. 107а. Оборудован 5 персональными компьютерами с доступом к локальной и глобальной компьютерным сетям.

4. Отдел иностранной литературы, корп.2 ауд. 207. Оборудован 1 персональным компьютером с доступом к локальной и глобальной компьютерным сетям.

5. Библиотека юридического факультета, корп.9, ауд. 4. Оборудована 11 персональными компьютерами с доступом к локальной и глобальной компьютерным сетям.

6. Читальный зал географического факультета, корп.8, ауд. 419. Оборудован 6 персональными компьютерами с доступом к локальной и глобальной компьютерным сетям.

Все компьютеры, установленные в помещениях научной библиотеки, оснащены следующим программным обеспечением:

Операционная система ALT Linux;

Офисный пакет Libreoffice.

Справочно-правовая система «КонсультантПлюс»

9. Методические указания для обучающихся по прохождению практики

Research work is a work of a scientific nature related to scientific research, research, experiments in order to expand existing and obtain new knowledge, test scientific hypotheses, establish patterns, scientific generalizations and justifications.

Research work is an independent, and often joint, study of the student with the supervisor, revealing his knowledge and the ability to apply them to solve specific practical problems.

The work on the research begins with the desire to deal with this issue. It is necessary to understand what the research will be about, to understand your strengths as a researcher in the chosen direction, whether it will benefit in future activities. A good topic for research work is the topic that is interesting for you and your supervisor. Formulate the topic correctly. The topic should be correct, narrow, and clear.

Formulate a scientific assumption that requires verification and theoretical justification or confirmation. The key research hypothesis should follow from the formulation of the research topic.

Make a speculative conclusion, review and in-depth analysis of the literature on the subject of your scientific work.

Start the research according to the chosen research method. At this stage, the work collects the necessary empirical data to test the proposed hypothesis.

The structure of the report can be presented as follows:

1. Title page

2. Summary (what is done, what is new received)

3. Content (title of chapters and paragraphs with indication of pages)

4. Introduction (designation of the problem, relevance, practical significance of the study; the object and subject of the study are determined; the purpose and objectives of the study; the methods of work are briefly listed)

5. Chapters of the main part, including the research part (analysis of scientific literature; selection of certain methods and specific research methods; research procedure and its stages)

6. Conclusions (interpretation of the results obtained)

7. Conclusion (a brief overview of the completed study)

8. List of references

9. Appendices (tables, graphs, reference books, etc.)

Фонды оценочных средств для проведения промежуточной аттестации

Планируемые результаты обучения по практике для формирования компетенции. Индикаторы и критерии их оценивания

ПК.1

Способен осуществлять выполнение экспериментов и оформление результатов исследований и разработок

| Компетенция (индикатор) | Планируемые результаты обучения | Критерии оценивания результатов обучения |
|--|--|--|
| <p>ПК.1.1 Постановка, планирование и решение научно- исследовательских задач по закреплённой тематике</p> | <p>Know the basic principles of setting research tasks on a fixed topic Be able to how to plan research activities on a fixed topic Possess the skills of solving research problems on a fixed topic</p> | <p style="text-align: center;">Неудовлетворительно</p> <p>Does not know the principles of setting research tasks on a fixed topic Doesn't know how to plan research activities on a fixed topic Does not have the skills to solve research problems on a fixed topic</p> <p style="text-align: center;">Удовлетворительно</p> <p>Knows superficially the principles of setting research tasks on a fixed topic Is able to how to plan research activities on a fixed topic with gross errors Possesses the skills of solving research problems on a fixed topic at a low level</p> <p style="text-align: center;">Хорошо</p> <p>Knows some principles of setting research tasks on a fixed topic Is able to how to plan research activities on a fixed topic with minor errors Possesses the skills of solving research problems on a fixed topic at the intermediate level</p> <p style="text-align: center;">Отлично</p> <p>Knows the basic principles of setting research tasks on a fixed topic Is able to how to plan research activities on a fixed topic Possesses the skills of solving research problems on a fixed topic</p> |
| <p>ПК.1.2 Использует в профессиональной деятельности экспериментальные и полевые методы научного исследования</p> | <p>Know the basic principles of conducting experimental and field research methods Be able to how to use experimental and field methods of scientific research in his professional activities Possess the skills of conducting</p> | <p style="text-align: center;">Неудовлетворительно</p> <p>Does not know the basic principles of conducting experimental and field methods of scientific research Is not able to use experimental and field methods of scientific research in his professional activities Does not possess the skills of conducting</p> |

| | | |
|--|---|---|
| | <p>experimental and field methods of scientific research</p> | <p>Неудовлетворительно experimental and field methods of scientific research</p> <p>Удовлетворительно Knows superficially the principles of conducting experimental and field methods of conducting scientific research Is able to how to use experimental and field methods of scientific research in his professional activity with gross errors Possesses the skills of conducting experimental and field research methods at a low level</p> <p>Хорошо Knows some principles of experimental and field research methods Is able to how to use experimental and field methods of scientific research in his professional activity with minor errors Possesses the skills of conducting experimental and field methods of scientific research at the intermediate level</p> <p>Отлично Knows the basic principles of conducting experimental and field research methods Is able to how to use experimental and field methods of scientific research in his professional activities Possesses the skills of conducting experimental and field methods of scientific research</p> |
| <p>ПК.1.3 Анализирует, интерпретирует, обобщает полученные научные данные, представляет в виде отчетов, обзоров, научных работ</p> | <p>Know how to analyze, interpret, summarize the obtained scientific data Be able to present the obtained scientific data in the form of reports, reviews, scientific works Possess the skills of analysis, interpretation, generalization of the obtained data and their presentation in the form of reports, reviews, scientific work</p> | <p>Неудовлетворительно Doesn't know how to analyze, interpret, summarize the scientific data obtained Does not know how to present the obtained scientific data in the form of reports, reviews, scientific works Does not possess the skills of analysis, interpretation, generalization of the obtained data and their presentation in the form of reports, reviews, scientific works</p> <p>Удовлетворительно Knows superficially how to analyze, interpret, summarize the scientific data obtained Is able to present the obtained scientific data in the form of reports, reviews, scientific papers with gross errors Possesses the skills of analyzing, interpreting, summarizing the obtained data and presenting them in the form of reports, reviews, scientific</p> |

| | | |
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| | | <p style="text-align: center;">Удовлетворительно</p> <p>works at a low level</p> <p style="text-align: center;">Хорошо</p> <p>Knows partially how to analyze, interpret, summarize the scientific data obtained Is able to present the obtained scientific data in the form of reports, reviews, scientific papers with minor errors Possesses the skills of analysis, interpretation, generalization of the obtained data and their presentation in the form of reports, reviews, scientific works at the intermediate level</p> <p style="text-align: center;">Отлично</p> <p>Knows how to analyze, interpret, summarize the obtained scientific data Is able to present the obtained scientific data in the form of reports, reviews, scientific works Possesses the skills of analysis, interpretation, generalization of the obtained data and their presentation in the form of reports, reviews, scientific works</p> |
|--|--|---|

Оценочные средства

Вид мероприятия промежуточной аттестации : Экзамен

Способ проведения мероприятия промежуточной аттестации : Защищаемое контрольное мероприятие

Продолжительность проведения мероприятия промежуточной аттестации :
время отводимое на доклад 4

Показатели оценивания

| | |
|--|----------------------------|
| Does not demonstrate professional knowledge and skills in the field of ecology and nature management; does not know how to use general scientific, special scientific research methods to collect primary information necessary for solving professional research or project tasks; does not have the skills of collective work, presenting their own opinion on a particular problem of the professional field; has insurmountable difficulties in writing a research paper | Неудовлетворительно |
| Demonstrates individual formed professional knowledge and skills in the field of ecology and nature management; is able to use general scientific, special scientific research methods to collect primary information necessary for solving professional research or project tasks; in the course of this activity, experiences objective difficulties, does not always use special scientific terminology, characterizes the essence of a particular theoretical construction; has the skills of teamwork, but can not present their own opinion on a particular problem in the field of ecology and nature management; has significant problems in writing research work | Удовлетворительно |

| | |
|--|----------------|
| Demonstrates sufficient professional knowledge and skills in the field of ecology and nature management; is able to use general scientific, special scientific research methods to collect primary information necessary for solving professional research or project tasks; at the same time makes individual mistakes that can be corrected independently; has the skills of collective work, presenting their own opinion on a particular problem in the field of ecology and nature management; has individual problems in writing research work | Хорошо |
| Demonstrates fully formed professional knowledge and skills in the field of ecology and nature management; is able to use various general scientific, special scientific research methods to collect, primary information necessary for solving professional research or project tasks; has all the necessary skills of teamwork, presenting their own opinion on a particular problem in the field of ecology and nature management; copes with writing a research paper | Отлично |