МИНОБРНАУКИ РОССИИ

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

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Программа производственной практики

UNDERGRADUATE PRACTICE

Код УМК 95074

Утверждено
Протокол №9
от «12» мая 2020 г.

Пермь, 2020

1. Вид практики, способ и форма проведения практики

Вид практики **производственная**
Тип практики **преддипломная практика**
Способ проведения практики **стационарная, выездная**
Форма (формы) проведения практики **дискретная**

2. Место практики в структуре образовательной программы

Производственная практика « Undergraduate practice » 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 :

Consolidation of theoretical knowledge gained in the course of studying at the university, development of skills and skills of applying them in practice, information and analytical preparation for writing the final qualification work

Задачи практики :

The main objectives of the pre-graduate practice are:
1) to deepen the acquaintance with the structure and content of the organization's activities in order to consolidate the knowledge gained in the disciplines of the specialty;
2) systematization, consolidation and expansion of practical skills;
3) development of the ability to work independently in solving the problems set in the final work;
4) collection of necessary materials and documents for the implementation of the final work;
5) study of literature on the topic of the final work, improving the ability to work with literature and documentation;
6) development of methods for analyzing environmental information and finding solutions to the tasks set in the final work;

3. Перечень планируемых результатов обучения

В результате прохождения практики **Undergraduate practice** у обучающегося должны быть сформированы следующие компетенции:

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

ОПК.2 готовность к участию в проведении научных исследований

ОПК.4 способность осваивать новые технологии и применять их для проведения естественнонаучных исследований

ПК.1 владеть методами лабораторных экологических исследований

ПК.3 владеть методами полевых экологических исследований

ПК.4 владеть методами экологического мониторинга, нормирования и снижения загрязнения окружающей среды, оценки воздействия на окружающую среду

4. Содержание и объем практики, формы отчетности

One of the elements of the educational process of training bachelors in the field of "Ecology and nature management" is pre-graduate practice-a type of educational work aimed at expanding and consolidating the theoretical and practical knowledge gained by bachelors in the learning process, the acquisition and improvement of practical skills in the chosen program, preparation for future professional activities.
Pre-graduate practice is of great importance for the performance of the final qualifying work of the bachelor. Pre-diploma practice is carried out the fourth year and takes the form of a research (practical) work performed by the student under approved research topics by field of study and topic of final qualifying work taking into account the interests and capabilities of the units in which it is conducted. The topic of the work can be defined as an independent part of the research work carried out within the framework of the scientific direction

Направления подготовки	05.03.06 Экология и природопользование (направленность: Экологическая инженерия и новая энергетика)
форма обучения	очная
№№ триместров, выделенных для прохождения практики	11,12
Объем практики (з.е.)	6
Объем практики (ак.час.)	216
Форма отчетности	Экзамен (12 триместр)

Примерный график прохождения практики

Количество часов	Содержание работ	Место проведения
Undergraduate practice		
216	Undergraduate practice is conducted in the fourth year of study and is carried out in the form of research (practical) work performed by the student within the approved research topic in the field of study and the topic of the final qualification work, taking into account the interests and capabilities of the departments in which it is conducted. The topic of the work can be defined as an independent part of the research work performed within the scientific direction of the graduating department. The content of the practice is determined by the supervisors and is reflected in the individual assignment for pre-graduate practice. The work of bachelors during the internship period is organized in accordance with the logic of work on the final qualification work. In each case, the internship program is changed and supplemented for each student, depending on the nature of the work performed. Pre-graduate practice consists of the preparatory stage, the stage of performing an individual task, the final stage of writing a report and defending the practice report The forms of practical training for persons with disabilities are determined taking into account the peculiarities of psychophysiological development, individual capabilities and the	The place of the practice can be a manufacturing enterprise, a cultural and service institution, environmental firms, protected areas, research organizations, departments and departments of government bodies of the local, regional and federal levels of government, etc., carrying out exploration, design, management or production activities. related to knowledge and skills in the following areas: - ecological design; - environmental management and audit; - nature protection and

Количество часов	Содержание работ	Место проведения
	state of health of students. 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.	rational nature management; - control of the impact on the components of the environment; - environmental monitoring and production control; - design and operation of protected areas; - assessment of the state of protected areas; - other areas related to the direction of "Ecology and nature management" 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.
1. The preparatory stage of the practice		
12	1. A student who has entered the practice gets acquainted with the structure and activities of the selected institution (enterprise), enters the designated department. 2. Together with the head of the practice, he specifies the forms, types and deadlines for completing the work in accordance with the individual plan (task) of the course. 3. It is determined by the sources of environmental information that it needs to find to perform the tasks of the practice, the methods of its processing and analysis. 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. 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.	It is carried out in a pre-agreed institution (enterprise, organization) that has a contract with PSNIU for internship. 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.
2. The stage of completing the tasks of the individual practice program		
170	As part of the main stage of the practice, the student performs the tasks proposed to him by the supervisor and approved in the individual plan (task) of the practice. Tasks include tasks for collecting, analyzing primary environmental information, systematizing it, and performing basic analytical work, i.e. tasks	It is carried out in a pre-agreed institution (enterprise, organization) that has a contract with PSNIU for internship.

Количество часов	Содержание работ	Место проведения
	necessary for high-quality performance of the first and partially second chapters of the final qualification work. Also, the task of the practice at its first stage is associated with the consolidation and use of theoretical knowledge in the field of ecology and nature management, processes and phenomena related to this area, the use of general scientific and special scientific methods to solve certain scientific and applied problems that are important for the work of the organization - the place of practice.	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.
3. Final stage (execution of the practice report)		
30	By the end of the internship, the student must collect materials in the form of a list of references, a literary review, analytical data, etc. The student draws up a report on the pre-graduate practice according to the rules and requirements approved by the department. There is a systematization and processing of the received materials. The main conclusions are made and the results of the study are presented.	It is carried out in a pre-agreed institution (enterprise, organization) that has a contract with PSNIU for internship. 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.
4. Defending the practice report		
4	The defense is held on the last day of the practice at a meeting of the commission consisting of 3 members of the Department of Biogeocenology and Nature Protection, within the terms established by the schedule of the educational process and by appointment of the meeting of the departments. During the defense, the student must submit a report and a presentation based on its main provisions, as well as answer all questions that arise from the commission and the audience. The main task of the stage is to assess the formation of a part of the competencies provided for by this stage of pre-graduate practice.	It is carried out in a pre-agreed institution (enterprise, organization) that has a contract with PSNIU for internship. 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. David Pimentel. Biofuels, Solar and Wind as Renewable Energy Systems. Benefits and Risks. Springer Science+Business Media B.V. 2008. Online ISBN 978-1-4020-8654-0. Текст электронный: // https://link.springer.com/book/10.1007/978-1-4020-8654-0 https://link.springer.com/book/10.1007/978-1-4020-8654-0

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

Дополнительная

1. Davide Geneletti, Chiara Cortinovis, Linda Zardo, Blal Adem Esmail: "Planning for Ecosystem Services in Cities", 2020, ISBN 978-3-030-20024-4. [Электронный ресурс]. https://link.springer.com/book/10.1007/978-3-030-20024-4

2. David Elliott, Terence Cook. Renewable Energy. From Europe to Africa. The Editor(s) (if applicable) and The Author(s) 2018. Online ISBN 978-3-319-74787-3. Текст электронный: // https://link.springer.com/book/10.1007/978-3-319-74787-3 https://link.springer.com/book/10.1007/978-3-319-74787-3

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://www.permecology.ru/ Nature of the Perm Region
priroda.permkrai.ru/ Ministry of Natural Resources, Forestry and Ecology of the Perm Region
https://elibrary.ru Electronic Library

7. Перечень информационных технологий, используемых при проведении практики

Образовательный процесс по практике **Undergraduate practice** 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).
The discipline does not provide for the use of special software.

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.
система тестирования Indigo (https://indigotech.ru/).

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

Audience for group and individual consultations, for intermediate certification-an audience equipped with presentation equipment (projector, screen, laptop) with appropriate software; chalk or marker board.
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 освоению дисциплины

Students who do not have medical contraindications and have passed targeted instruction at the departments are allowed to practice.

The organization of the practice includes: the presence of an individual plan (task) of the practice, which specifies the purpose and objectives of the practice, its main activities, the need for a certain result. The practice is carried out on the basis of a signed contract between the PSNIU and the organization-the place of practice.

Organizations (places of practice) have environmental specialization, for example, the Ministry of Natural Resources, Forestry and Ecology of the Perm Region, Uralkali, "Kama Basin Water Management", etc. While in practice at the place of practice (organization), the intern needs to become more familiar with the principles, forms, types and methods of work in the field of ecology and nature management, as well as try to use the environmental knowledge gained during the training to analyze and diagnose the organization's activities.

The initiative research or project should correspond to the subject of the organization's activity-the place of practice, be part of its scientific or practical programs, and/or be important for improving its activities. The author's development should also be closely related to the focus of the bachelor's program and, ultimately, contribute to a deeper study of a particular problem of regional development. The student should be able to show their research and design skills in formulating directions for correcting the current situation in one of the aspects of the organization's activities.

The student draws up a report on the production practice in accordance with the rules and requirements approved by the department. There is a systematization and processing of the received materials. The main conclusions are made and the results of the study are presented.

During the defense, the student must disclose the purpose and objectives of the practice, the results obtained, and their possible application in the final qualifying work. In addition, the student must be able to justify, prove and explain the results of their activities during the practice. The performance should not exceed 7 minutes.

Фонды оценочных средств для проведения промежуточной аттестации

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

ОПК.2

готовность к участию в проведении научных исследований

Компетенция	Планируемые результаты обучения	Критерии оценивания результатов обучения
ОПК.2 готовность к участию в проведении научных исследований	KNOW the main directions and methods of scientific research in the field of ecology and nature management. BE ABLE to plan scientific research, formulate hypotheses and select methods for testing them. POSSESS the skills of organizing and conducting scientific research in the field of ecology and nature management, skills in working with primary sources and scientific literature.	**Неудовлетворительно** Does not know the main directions and methods of scientific research in the field of ecology and nature management. Does not know how to plan scientific research, formulate hypotheses and select methods for testing them. Does not have the skills to organize and conduct scientific research in the field of ecology and nature management, skills in working with primary sources and scientific literature. **Удовлетворительно** He/she knows the main directions and methods of scientific research in the field of ecology and nature management, but makes serious mistakes. He/she is able to plan scientific research, formulate hypotheses and select methods for testing them, but experience significant difficulties. He/she has the skills to organize and conduct scientific research in the field of ecology and nature management, the skills to work with primary sources and scientific literature, but to make gross mistakes. **Хорошо** He/she knows some areas and methods of scientific research in the field of ecology and nature management. He/she is able to plan scientific research, formulate hypotheses and select methods for testing them, but experience some difficulties. He/she has some skills in organizing and conducting scientific research in the field of ecology and nature management, skills in working with primary sources and scientific literature. **Отлично** He/she knows the main directions and methods

		Отлично of scientific research in the field of ecology and nature management. He/she is able to plan scientific research, formulate hypotheses and select methods for testing them. Has the skills of organizing and conducting scientific research in the field of ecology and nature management, skills in working with primary sources and scientific literature.

ОПК.4

способность осваивать новые технологии и применять их для проведения естественнонаучных исследований

Компетенция	Планируемые результаты обучения	Критерии оценивания результатов обучения
ОПК.4 способность осваивать новые технологии и применять их для проведения естественнонаучных исследований	KNOW new technologies for conducting natural science research in the field of ecology and nature management. BE ABLE to apply new technologies for conducting natural science research in the field of ecology and nature management. POSSESS the ability to master new technologies and apply them to conduct natural science research in the field of ecology and nature management.	**Неудовлетворительно** Does not know new technologies for conducting natural science research in the field of ecology and nature management. Does not know how to apply new technologies for conducting natural science research in the field of ecology and nature management. Does not possess the ability to master new technologies and use them for conducting natural science research in the field of ecology and nature management. **Удовлетворительно** Knows new technologies for conducting natural science research in the field of ecology and nature management, but makes serious mistakes. He/she is able to apply new technologies for conducting natural science research in the field of ecology and nature management, but to experience significant difficulties. He/she has the ability to master new technologies and apply them to conduct natural science research in the field of ecology and nature management, but to make gross mistakes. **Хорошо** He/she knows some new technologies for conducting natural science research in the field of ecology and nature management. He/she is able to apply new technologies for conducting natural science research in the field of ecology and nature management, but to experience some difficulties.

		Хорошо Has the ability to master new technologies and apply them to conduct natural science research in the field of ecology and nature management at the intermediate level. **Отлично** He/she knows new technologies for conducting natural science research in the field of ecology and nature management. He/she is able to apply new technologies for conducting natural science research in the field of ecology and nature management. Has the ability to master new technologies and apply them to conduct natural science research in the field of ecology and nature management.

ПК.1

владеть методами лабораторных экологических исследований

Компетенция	Планируемые результаты обучения	Критерии оценивания результатов обучения
ПК.1 владеть методами лабораторных экологических исследований	KNOW the basic methods of laboratory environmental research BE ABLE to process data obtained in the course of laboratory environmental studies POSSESS the methodology of laboratory environmental research	**Неудовлетворительно** Does not know the basic methods of laboratory environmental research. He/she is not able to process the data obtained in the course of laboratory environmental studies. Does not know the methodology of laboratory environmental studies. **Удовлетворительно** Knows the basic methods of laboratory environmental research, but makes serious mistakes. He/she can process data obtained in the course of laboratory environmental studies, but experience significant difficulties. He/she knows the methodology of laboratory environmental studies, but makes gross mistakes. **Хорошо** Knows some methods of laboratory environmental research. He/she can process data obtained in the course of laboratory environmental studies, but experience some difficulties. He/she has a partial knowledge of the methodology of laboratory environmental studies. **Отлично**

		Отлично Knows the basic methods of laboratory environmental research. He/she is able to process data obtained during laboratory environmental studies. He/she is proficient in the methodology of laboratory environmental studies.

ПК.3

владеть методами полевых экологических исследований

Компетенция	Планируемые результаты обучения	Критерии оценивания результатов обучения
ПК.3 владеть методами полевых экологических исследований	KNOW the basic methods of field environmental research. BE ABLE to process data obtained in the course of field environmental research. POSSESS the methodology of field environmental research.	**Неудовлетворительно** Does not know the basic methods of field environmental research. He/she is not able to process the data obtained in the course of field environmental studies. Does not know the methodology of field environmental research. **Удовлетворительно** Knows the methods of field environmental research, but makes serious mistakes. He/she is able to process data obtained in the course of field environmental studies, but experience significant difficulties. He/she knows the methodology of field environmental research, but makes gross mistakes. **Хорошо** Knows some methods of field environmental research. He/she can process data obtained in the course of field environmental studies, but experience some difficulties. He/she has a partial knowledge of the methodology of field environmental research. **Отлично** Knows the basic methods of field environmental research. He/she is able to process data obtained in the course of field environmental studies. He/she is proficient in the methodology of field environmental research.

ПК.4

владеть методами экологического мониторинга, нормирования и снижения загрязнения окружающей среды, оценки воздействия на окружающую среду

ПК.4 владеть методами экологического мониторинга, нормирования и снижения загрязнения окружающей среды, оценки воздействия на окружающую среду	KNOW the goals and objectives of environmental monitoring and regulation, their principles, regulatory documents regulating emissions and discharges of pollutants into the environment. BE ABLE to plan measures to reduce the level of environmental pollution, set standards for waste generation and limits on their placement, standards for maximum permissible discharges of harmful substances, set standards for maximum permissible emissions of harmful substances. HAVE the skills to develop a program of environmental observations, environmental assessment and forecast, regulation and reduction of environmental pollution, and environmental impact assessment.	**Неудовлетворительно** Does not know the goals and objectives of environmental monitoring and regulation, their principles, regulatory documents regulating emissions and discharges of pollutants into the environment. Does not know how to plan measures to reduce the level of environmental pollution, set standards for waste generation and limits on their placement, standards for maximum permissible discharges of harmful substances, set standards for maximum permissible emissions of harmful substances. Does not have the skills to develop a program of environmental observations, environmental assessment and forecast, regulation and reduction of environmental pollution, environmental impact assessment. **Удовлетворительно** Knows the goals and objectives of environmental monitoring and regulation, their principles, regulatory documents regulating emissions and discharges of pollutants into the environment, but make serious mistakes. He/she is able to plan measures to reduce the level of environmental pollution, set standards for waste generation and limits on their placement, standards for maximum permissible discharges of harmful substances, set standards for maximum permissible emissions of harmful substances, but experience significant difficulties. He/she has the skills to develop a program of environmental observations, environmental assessment and forecast, regulation and reduction of environmental pollution, environmental impact assessment, but to make gross mistakes. **Хорошо** Knows the goals and objectives of environmental monitoring and regulation, their principles, some regulatory documents regulating emissions and discharges of pollutants into the environment. He/she is able to plan measures to reduce the level of environmental pollution, set standards for waste generation and limits on their placement, standards for maximum permissible

Компетенция | **Планируемые результаты обучения** | **Критерии оценивания результатов обучения**

		Хорошо discharges of harmful substances, set standards for maximum permissible emissions of harmful substances, but experience some difficulties. He/she has some skills in developing a program of environmental observations, environmental assessment and forecasting, regulation and reduction of environmental pollution, and environmental impact assessment. **Отлично** Knows the goals and objectives of environmental monitoring and regulation, their principles, regulatory documents regulating emissions and discharges of pollutants into the environment. He/she is able to plan measures to reduce the level of environmental pollution, set standards for waste generation and limits on their placement, standards for maximum permissible discharges of harmful substances, set standards for maximum permissible emissions of harmful substances. He/she has the skills to develop a program of environmental observations, environmental assessment and forecast, regulation and reduction of environmental pollution, and environmental impact assessment.

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 know how to make a program of field, laboratory and desk work, does not know the methods of field and laboratory environmental research, the skills of interpretation and development of recommendations.	**Неудовлетворительно**
He/she is able to draw up a program of field work, knows the methods of field research, the skills of interpretation and development of recommendations.	**Удовлетворительно**
He/she is able to draw up a program of field and desk work, knows the methods of field environmental research, the skills of interpretation and development of recommendations.	**Хорошо**
He/she is able to draw up a program of field, laboratory and desk work, knows the	**Отлично**

methods of field and laboratory environmental research, the skills of interpretation and development of recommendations.	**Отлично**