

**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  
**ACADEMIC PRACTICE IN URBOECOLOGY**  
Код УМК 95379

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

Пермь, 2021

## **1. Вид практики, способ и форма проведения практики**

Вид практики **учебная**

Тип практики **практика по получению первичных профессиональных умений и навыков**

Способ проведения практики **стационарная, выездная**

Форма (формы) проведения практики **дискретная**

## **2. Место практики в структуре образовательной программы**

Учебная практика « Academic practice in Urboecology » 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 :**

Formation of skills for planning, organizing and conducting field and laboratory work, measures for managing and optimizing environmental management in an urban environment, acquisition of practical mapping skills in the field of urban ecology, conducting excursions to economic objects that ensure the functioning of the urban environment

### **Задачи практики :**

1. To develop skills in collecting and analyzing stock and literary materials in the field of urban ecology;ogy;
2. To form ideas about the modern system of exploitation of natural resources in the urban environment;
3. To form ideas about the modern system of environmental protection in urbanized areas;
4. Master key diagnostic methods for monitoring the state of the environment in the city;
5. To study the main methods of rationing and assessing the state of the environment in urbanized areas.

### **3. Перечень планируемых результатов обучения**

В результате прохождения практики **Academic practice in Urboecology** 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 закреплённой 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

**ПК.7** Способен оценивать состояние окружающей среды для различных целей (экологический мониторинг, оценка состояния отдельных компонентов природной среды, проведение инженерно-экологических изысканий, ОВОС) и на основе полученных данных разрабатывать рекомендации по использованию природных ресурсов, сохранению и восстановлению окружающей и природной среды

#### **Индикаторы**

**ПК.7.2** Оценивает состояние отдельных компонентов природной среды: атмосферного воздуха, подземных и поверхностных вод, почв и недр, растительного и животного мира

**УК.10** Способен использовать базовые дефектологические знания в социальной и профессиональной сферах

#### **Индикаторы**

**УК.10.3** Выстраивает профессиональное взаимодействие с лицами, имеющими психофизиологические особенности, с учетом нозологии

#### 4. Содержание и объем практики, формы отчетности

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

#### Примерный график прохождения практики

Количество часов	Содержание работ	Место проведения
Scientific foundations of urboecology		
20	This section considers the modern system of exploitation of natural resources and environmental protection in urbanized territories; key diagnostic methods for monitoring the state of the environment in urban conditions; the main methods of rationing and assessing the state of the environment in urbanized territories.	Conducting field tours of urbanized landscapes within the Perm Region (Approximate locations: Perm, Kungur, Solikamsk). 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.
Anthropogenic changes in the components of the city environment		
20	Training in occupational safety and health. Introduction to the general principles of working in the laboratory, tasks to be solved, laboratory equipment and devices. During the routes in urbanized areas, the main components of urban landscapes are described, special attention is paid to their modified natural components: soils, vegetation cover, water bodies, etc.; description forms are compiled, field material is	Conducting field tours of urbanized landscapes within the Perm Region (Approximate locations: Perm, Kungur, Solikamsk). The forms of practical training for persons with

Количество часов	Содержание работ	Место проведения
	collected, and photo fixation is carried out.	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.
<b>Sustainable development and ecological balance of cities</b>		
20	<p>The methods of maintaining ecological balance in cities that ensure self-restoration and self-purification of the natural environment, that is, the equilibrium state between nature and the city, due to compliance with the conditions of dynamic equilibrium, are considered:</p> <ul style="list-style-type: none"> <li>- anthropogenic changes should not have the character of catastrophes leading to new environmental crises;</li> <li>- anthropogenic changes should be gradual, ensure the correct distribution and strength of anthropogenic loads and the necessary conditions for the adaptation of humans and the natural environment to them.</li> </ul> <p>It also gives an idea of the methods of constructing an environmentally balanced structure of urbanized territories.</p>	<p>Conducting field tours of urbanized landscapes within the Perm Region (Approximate locations: Perm, Kungur, Solikamsk). 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.</p>
<b>Green technologies in the ecological development of cities</b>		
22	The article considers the technologies and methods used to ensure a comfortable and sustainable urban environment, ensuring a balance between the sustainability of the natural environment and the needs of the urban population. Excursions to enterprises and facilities using "green" technologies are carried out.	Conducting excursions to objects and enterprises within the Perm Region (Approximate places of excursions: LLC "Novogor-Prikamye", Perm; Biological treatment facilities, Perm; Kamskaya HPP).

Количество часов	Содержание работ	Место проведения
		<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>
Preparation and defense of the practice report		
26	Preparation and defense of the final report on the academic practice.	Perm State University, Department of Biogeocenology and Nature Protection.

## **5. Перечень учебной литературы, необходимой для проведения практики**

### **Основная**

1. Myrna H. P. Hall, Understanding Urban Ecology. An Interdisciplinary Systems Approach / Myrna H. P. Hall, Stephen B. Balogh // Springer, Cham, 2019. — 360 p. — ISBN 978-3-030-11259-2. — Текст : электронный // Электронно-библиотечная система SpringerLink : [сайт]. <https://link.springer.com/book/10.1007/978-3-030-11259-2>
2. Arup K. Sarma, Vijay P. Singh, Rajib K. Bhattacharjya, Suresh A. Kartha. Urban Ecology, Water Quality and Climate Change. Springer, Cham, 2018. Online ISBN 978-3-319-74494-0. Текст электронный. <https://link.springer.com/book/10.1007/978-3-319-74494-0>

### **Дополнительная**

1. Robert A. McCleery, Christopher E. Moorman, M. Nils Peterson. Urban Wildlife conservation. Theory and Practice. Springer, Boston, MA, 2014. Online ISBN 978-1-4899-7500-3. Текст электронный. <https://link.springer.com/book/10.1007/978-1-4899-7500-3>
2. Nickolas J. Themelis, A.C. (Thanos) Bourtsalas. Recovery of Materials and Energy from Urban Wastes. A Volume in the Encyclopedia of Sustainability Science and Technology, Second Edition. Springer Science+Business Media LLC, part of Springer Nature 2019. Online ISBN 978-1-4939-7850-2. Текст электронный: // <https://link.springer.com/referencework/10.1007/978-1-4939-7850-2>  
<https://link.springer.com/referencework/10.1007/978-1-4939-7850-2>

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

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

<https://www.researchgate.net/topics> ResearchGate

<https://elibrary.ru> Scientific Electronic Library

<https://cyberleninka.ru> Scientific electronic Library " CYBERLENINKA»

## 7. Перечень информационных технологий, используемых при проведении практики

Образовательный процесс по практике **Academic practice in Urboecology** предполагает использование следующего программного обеспечения и информационных справочных систем:

List of required licensed and / or freely distributed software:

1) office suite of applications (word processor, program for preparing electronic presentations);

2) video demonstration program (player);

3) An application that allows you to view and play the media content of PDF files.

Presentation materials (slides on the topics of lectures and practical classes); on

-line access to the Electronic Library System;

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 a laptop: OS "Alt Education" (Contract No. DS 003-2020). The

discipline does not provide for the use of specialized software

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

При организации дистанционной работы и проведении занятий в режиме онлайн могут

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

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

For seminars (practical) type, group and individual consultations and intermediate certification an audience

equipped with presentation equipment (projector, screen, laptop) with appropriate software; chalk or marker

board

задания для совместной работы.

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

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.

Facilities for storage and preventive maintenance of educational equipment

Specialized equipment: Compass, field diary, colored pencils, folding meter, shovels, knives, soil drill, camera, bags and labels for sampling, tarpaulin, 10% HCI solution, kappameter, protractor, 20 m tape measure, GPS-navigators, binoculars.

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**

At the end of the training practice, students make up and hand over to the supervisor a report with the results of the work performed during the internship.

The report contains the following sections: title page; content; introduction; description of the place of practice, visited objects; practical options for implementing the project; results of the work carried out (cartographic materials, route characteristics, results of studying key areas, description forms, etc.); conclusion, which contains conclusions on the implementation of the tasks assigned to the practice and possible suggestions for improving its organization; review of the head of the practice from the organization (if available); review of the head of the practice from the department. The report on the implementation of the practice is submitted in typewritten form, designed in accordance with the standards for the design of reports.

## 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><b>ПК.1.1</b> Постановка, планирование и решение научно- исследовательских задач по закреплённой тематике</p>	<p>KNOW the basic concepts used to describe natural ecosystems, the main similarities and differences in the structure, composition and functioning of different biogeocenoses. KNOW how to define biogeocenosis boundaries, ecotone, spatial structure of biogeocenosis. KNOW how to carry out field research.</p>	<p style="text-align: center;"><b>Неудовлетворительно</b></p> <p>Does not know the basic concepts used to describe natural ecosystems. Is not able to name the main similarities and differences in structure, composition and functioning of different biogeocenoses. Is not able to define boundaries of biogeocenoses, ecotone and spatial structure of studied communities. Does not know the methods of field research.</p> <p style="text-align: center;"><b>Удовлетворительно</b></p> <p>Is not able to name the main similarities and differences in structure, composition and functioning of different biogeocenoses. Is difficult in defining the boundaries of biogeocenoses, ecotone and spatial structure of studied communities. Is not sufficiently proficient in field research methods.</p> <p style="text-align: center;"><b>Хорошо</b></p> <p>Knows the basic concepts used to describe natural ecosystems. Is able to name the main similarities and differences in the structure, composition and functioning of different biogeocenoses. Makes minor mistakes. Can identify the boundaries of biogeocenoses, ecotone and the spatial structure of the communities under study. Knows the methods of field research.</p> <p style="text-align: center;"><b>Отлично</b></p> <p>Excellent knowledge of basic concepts used to describe natural ecosystems. Is able to name the main similarities and differences in structure, composition and functioning of different biogeocenoses. Well able to identify the boundaries of biogeocenoses, ecotone and spatial structure of communities under study. Is fully proficient in field research methods.</p>
<p><b>ПК.1.2</b></p>	<p>KNOW the basic experimental</p>	<p style="text-align: center;"><b>Неудовлетворительно</b></p>

<p>Использует в профессиональной деятельности экспериментальные и полевые методы научного исследования</p>	<p>and field methods of scientific research. KNOW how to apply the main methods in practice. KNOW how to identify the most appropriate experimental and field methods of scientific research for specific tasks.</p>	<p><b>Неудовлетворительно</b> Does not know the basic experimental and field methods used in practice. Difficulty in selecting a specific method to solve the tasks assigned to him/her. Unable to collect information, describe natural communities. Is unable to analyse the available information and draw concrete conclusions.</p> <p><b>Удовлетворительно</b> Little knowledge of the main experimental and field methods used in practice. Has difficulty in selecting a specific method to solve the tasks assigned to him/her. Able to collect information, describe natural communities. Willing to analyse the available information and draw concrete conclusions.</p> <p><b>Хорошо</b> Has a good knowledge of the main experimental and field methods used in practice. Is versed in a variety of methods and is able to make a choice of a particular method to solve the tasks set for him/her. Is able to collect information, to describe natural communities. Willing to analyse available information and draw concrete conclusions.</p> <p><b>Отлично</b> Excellent knowledge of the main experimental and field methods used in practice. Is versed in a variety of methods, and is able to make a choice of a particular method to solve the tasks set for him/her. Able to collect information, to describe natural communities. Willing to analyse available information and draw concrete conclusions. Can present all the information obtained in a holistic way.</p>
<p><b>ПК.1.3</b> Анализирует, интерпретирует, обобщает полученные научные данные, представляет в виде отчетов, обзоров, научных работ</p>	<p>KNOW the main ways and methods of analysing and communicating the scientific data obtained. KNOW how to write reports, reviews and research papers. KNOW how to analyse and summarise the data obtained in practice, how to write a report in theoretical and practical part.</p>	<p><b>Неудовлетворительно</b> Not able to analyse, interpret, summarise the data obtained during zonal practice. Is not able to write reports and reviews. Unable to be involved in writing scientific articles. Unable to work in a group. Unable to work individually.</p> <p><b>Удовлетворительно</b> Can analyse, interpret, summarise the data obtained during the practical training in the zone. Can work individually and in a group. Difficulty in preparing reports and surveys. Can not be involved in writing scientific articles.</p> <p><b>Хорошо</b></p>

		<p style="text-align: center;"><b>Хорошо</b></p> <p>Is able to analyse, interpret and summarise the data obtained during the practical training. Can work individually and as part of a group. Experienced in writing reports and reviews. Makes inaccuracies and mistakes. Can not be involved in writing scientific articles.</p> <p style="text-align: center;"><b>Отлично</b></p> <p>Is able to analyse, interpret and summarise the data obtained during the practice area. Has skills of individual and group work. Has good experience in writing reports and reviews. Can be involved in writing scientific articles.</p>
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### ПК.7

**Способен оценивать состояние окружающей среды для различных целей (экологический мониторинг, оценка состояния отдельных компонентов природной среды, проведение инженерно-экологических изысканий, ОВОС) и на основе полученных данных разрабатывать рекомендации по использованию природных ресурсов, сохранению и восстановлению окружающей и природной среды**

Компетенция (индикатор)	Планируемые результаты обучения	Критерии оценивания результатов обучения
<p><b>ПК.7.2</b> Оценивает состояние отдельных компонентов природной среды: атмосферного воздуха, подземных и поверхностных вод, почв и недр, растительного и животного мира</p>	<p>KNOW: Land valuation methodologies; KNOW: Determine the optimum list of indicators needed to assess the condition of soil resources; KNOW: how to assess the condition of the soil cover of a land plot.</p>	<p style="text-align: center;"><b>Неудовлетворительно</b></p> <p>Does not know methods of evaluation of land resources; is not able to identify the list of indicators required to assess the condition of soil resources; cannot assess the condition of land cover of a land plot.</p> <p style="text-align: center;"><b>Удовлетворительно</b></p> <p>Fragmentary knowledge of methods of evaluation of land resources; able to identify the list of indicators required to assess the condition of soil resources; able to assess the condition of the soil cover of a land plot.</p> <p style="text-align: center;"><b>Хорошо</b></p> <p>Knows basic methods of evaluation of land resources; is able to determine the list of indicators required to evaluate the condition of soil resources; can evaluate the condition of the soil cover of a land plot.</p> <p style="text-align: center;"><b>Отлично</b></p> <p>Is aware of the methods of land resources assessment; is able to determine the optimal list of indicators required to assess the condition of soil resources; can assess the condition of the soil cover of a land plot according to the selected criteria.</p>

## УК.10

### Способен использовать базовые дефектологические знания в социальной и профессиональной сферах

Компетенция (индикатор)	Планируемые результаты обучения	Критерии оценивания результатов обучения
<b>УК.10.3</b> Выстраивает профессиональное взаимодействие с лицами, имеющими психофизиологические особенности, с учетом нозологии	KNOWS the peculiarities of professional interaction in field research. CAN apply the theoretical knowledge in practice. CAN apply the theoretical knowledge in practice.	<b>Неудовлетворительно</b> Does not know the peculiarities of professional and interdisciplinary interaction in the field of field research. Not able to apply acquired theoretical knowledge in practice. Does not know the methods of field research. <b>Удовлетворительно</b> Difficult to name the features of professional and interdisciplinary interaction in the field of field research. Not able to apply acquired theoretical knowledge in practice. Poor with field research methods. <b>Хорошо</b> Can name the features of professional and interdisciplinary interaction in the field of field research. Makes minor mistakes. Has good theoretical background and is able to apply acquired theoretical knowledge in practice. Is proficient in the methods of field research. <b>Отлично</b> Is able to name the peculiarities of professional and interdisciplinary interaction in the field of field research. Has good theoretical background and is able to apply the acquired theoretical knowledge in practice. Proficient in field research methods.

### Оценочные средства

**Вид мероприятия промежуточной аттестации :** Экзамен

**Способ проведения мероприятия промежуточной аттестации :** Письменное контрольное мероприятие

**Продолжительность проведения мероприятия промежуточной аттестации :**

2

### Показатели оценивания

Has no idea about the modern system of exploitation of natural resources in the urban environment; Has no idea about the modern system of environmental protection in urbanized areas;	<b>Неудовлетворительно</b>
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<p>Does not know the methods of diagnostics monitoring the state of the environment in the city; Does not know the methods of rationing and assessing the state of the environment in urbanized areas.</p>	<p><b>Неудовлетворительно</b></p>
<p>Has an idea of the modern system of exploitation of natural resources in the urban environment; Has an idea of the modern system of environmental protection in urbanized areas; In general, he knows the methods of diagnostics and control of the state of the environment in the city; In general, he knows the methods of rationing and assessing the state of the environment in urbanized areas.</p>	<p><b>Удовлетворительно</b></p>
<p>Has an idea of the modern system of exploitation of natural resources in the urban environment; Has an idea of the modern system of environmental protection in urbanized areas; He/she knows well the methods of diagnostics and control of the state of the environment in the city; He/she knows well the methods of rationing and assessing the state of the environment in urbanized areas.</p>	<p><b>Хорошо</b></p>
<p>Has a stable knowledge of the modern system of exploitation of natural resources in the urban environment; Has a stable knowledge of the modern system of environmental protection in urbanized areas; Methods of diagnostics of control of the state of the environment in the city conditions are mastered; Methods of rationing and assessment of the state of the environment in urbanized areas have been mastered.</p>	<p><b>Отлично</b></p>