Federal State Autonomous Educational Institution for Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
(RUDN University)

Institute of Environmental Engineering

PRACTICE PROGRAM

Pre-graduate practice

(наименование практики)

Industrial practice

(вид практики: учебная, производственная)

Recommended by the Methodological Council for the Education Field:

05.04.06 «Ecology and Nature Management»

(код и наименование направления подготовки/специальности)

Practical training of students is conducted within the framework of the implementation of the higher education program:

«Nature Management» in the framework of the SCO University (partner university: Shandong University)/
Управление природопользованием» в рамках УШОС (университет-партнер: Шандуньский университет)

(наименование (профиль/специализация) ОП ВО)

2025

1. THE PURPOSE OF THE PRACTICE

The purpose of the "Research work of a master's student" is an expanding the professional knowledge acquired by masters in the process of study, developing practical skills and abilities in conducting independent research work, practical participation in research work of research teams, as well as collecting, analyzing and summarizing scientific material, developing original scientific ideas for preparing a master's thesis. Pre-graduate practice is carried out to complete the final qualifying work and is mandatory.

2. REQUIREMENTS FOR THE RESULTS OF TRAINING BASED ON THE RESULTS OF THE INTERNSHIP

The implementation of the "Pre-graduate practice" is aimed at the formation of the following competencies among students:

Table 2.1. List of competencies formed by students during the internship (results of training based on the results of practice)

Competence code	Code and name of the competence achievement indicator
GC-1 - able to carry out a critical analysis of problem situations based on a systematic approach, to develop a strategy of actions.	**GC-1.1** able to analyze a problem situation as a system, identifying its components and the connections between them
	GC-1.2 possesses argumentation and develops a meaningful strategy for solving a problem situation based on systemic and interdisciplinary approaches
	GC -1.3 knows the basics of the strategy and identifies possible risks, suggesting ways to eliminate them
GC-2 - able to manage the project at all stages of its life cycle.	**GC -2.1** able to formulate a project task based on the problem posed and the way to solve it
	GC-2.2 able to develop a project concept, formulates a goal, tasks, justifies the relevance, expected results and scope of their application
	GC-2.3 knows how to develop a project implementation plan taking into account possible risks, plans the necessary resources
GC-3 - able to organize and manage the work of the team, developing a team strategy to achieve the goal	**GC -3.1** knows the techniques and methods of teamwork, organizes the selection of team members to achieve the goal
	GC -3.2 able to organize and adjust the work of the team, including on the basis of collegial decisions
	GC-3.3 able to delegate authority to team members and distributes assignments, gives feedback on the results, takes responsibility for the overall result
GC-4. Able to apply modern communication technologies, including in a foreign language(s) for academic and professional interaction	**GC-4.1** able to establish contacts and organize communication in accordance with the needs of joint activities, using modern communication technologies
	GC -4.2 knows the basics of business documentation and uses professional vocabulary in foreign and Russian languages

	GC -4.3 able to organize discussion of results and present the results of research and project activities at various public events in Russian or a foreign language, choosing the most appropriate format
GC-5 able to analyze and take into account the diversity of cultures in the process of intercultural interaction.	**GC-5.1.** knows the main categories of philosophy, the laws of historical development, the basics of intercultural communication
	GC-5.2 able to communicate in the world of cultural diversity and demonstrate mutual understanding between students from different cultures in compliance with ethical and intercultural norms
	GC-5.3. has practical skills in analyzing philosophical and historical facts, assessing cultural phenomena; ways of analyzing and revising his views in case of disagreements and conflicts in intercultural communication
GC-6 - able to determine and implement the priorities of his own activities and ways to improve it based on self-assessment.	**GC-6.1** able to assess his resources and their limits (personal, situational, temporary), makes reasonable use of them
	GC-6.2 able to identify educational needs and ways to improve their own (including professional) activities based on self-assessment
	GC-6.3 has the skills to build a flexible professional trajectory, taking into account the accumulated experience of professional activity, dynamically changing requirements of the labor market and personal development strategy

Competence code	**Code and name of the competence achievement indicator**
GPC-1. Able to use philosophical concepts and methodology of scientific knowledge in the study of various levels of organization of matter, space and time.	**GPC -1.1** Knows the philosophical concepts of natural science and the methodology of scientific knowledge,
	GPC -1.2 Able to use in-depth knowledge of the philosophical concepts of natural science in assessing the consequences of their professional activities
	GPC -1.3 Able to apply the acquired knowledge in their research activities, to make correct generalizations and conclusions
GPC -2. Able to use special and new sections of ecology, geoecology and nature management in solving research and applied problems of professional activity.	**GPC -2.1** Knows the basics of ecology, geoecology, environmental economics and circular economy, as well as environmental management
	GPC -2.2 Able to use environmental, economic and other special knowledge and algorithms to solve professional problems
	GPC -2.3 Able to find, analyze and competently use the latest information and modern techniques in the performance of research and applied tasks
GPC -3. Able to apply environmental research methods to solve research and	**GPC -3.1** Knows the principles and methods of environmental monitoring of environmental components

applied problems of professional activity.	**GPC -3.2** Owns analytical methods for monitoring pollutants and physical impacts and processing the information received
	GPC -3.3 Able to develop systems for environmental monitoring and control in production and solve applied problems in professional activities
GPC -4. Able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management.	**GPC -4.1** Knows the basics of environmental regulation and the basics of legislation in the field of nature management
	GPC -4.2 Knows how to use and apply regulatory legal acts in the field of ecology and nature management
	GPC -4.3 Able to use the norms of professional ethics in their professional activities
GPC -5. Able to solve the problems of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies.	**GPC -5.1** Knows how to choose and apply an algorithm for solving environmental problems and implements algorithms using software
	GPC -5.2 Able to use information technology tools to search, store, process, analyze and present information
	GPC -5.3 Knows how to process Earth remote sensing data and use cartographic materials, owns modern GIS technologies
GPC -6 Able to design, represent, protect and disseminate the results of their professional activities, including research.	**GPC -6.1** Able to receive, analyze, summarize the necessary scientific information using modern research methods, present their own results in the form of scientific articles and public speeches
	GPC -6.2 Possesses the skills of an oral report and presentation of the results of project and scientific activities, fluency in the material
	GPC -6.3 Knows the methodological foundations of scientific research, the requirements of copyright and scientific ethics

Competence code	**Code and name of the competence achievement indicator**
SPC-1 Ability to formulate problems, objectives and methods of scientific research, generalize the results obtained, formulate conclusions and practical recommendations based on the research results	**SPC -1.1** Knows the basics of research planning methodology
	SPC -1.2 Able to generalize the obtained results, formulate conclusions and practical recommendations based on the research results
SPC -2 The ability to creatively use knowledge of fundamental and applied sections of special disciplines in production and technological activities	**SPC -2.1** Possesses the skills to apply advanced scientific achievements to select and implement the best available technologies (BAT)
SPC -3 Mastery of the basics of design, expert-analytical activities and research using modern approaches and methods, equipment and computing systems	**SPC -3.1** Capable of planning the implementation of modern approaches and methods, equipment and computing systems to solve problems in the professional field
	SPC -3.2 Has a basic understanding of design and expert-analytical activities

SPC -4 Able to use modern methods of processing and interpreting environmental information when conducting scientific and industrial research	**SPC -4.1** Able to apply modern methods of processing and interpreting environmental information when conducting industrial research
	SPC -4.2 Able to interpret the obtained research results from the point of view of compliance with safety and performance indicators
	SPC -4.3 Possesses the skills to conduct control and supervisory activities based on modern methods of processing environmental information
SPC -5 Capable of developing standard environmental protection measures and assessing the impact of planned structures or other forms of economic activity on the environment.	**SPC -5.1** Able to develop and plan the implementation of standard environmental protection measures taking into account international practice and the requirements of national legislation
	SPC -5.2. Possesses skills in assessing the impact of planned structures or other forms of economic activity on the environment
	SPC -5.3 Knows the requirements for the preparation and implementation of programs for environmental modernization of enterprises, the introduction of BAT, the organization of environmental monitoring, accounting and reporting.
SPC -6 Able to diagnose environmental protection issues, develop practical recommendations for its protection and ensuring sustainable development	**SPC -6.1** Capable of identifying discrepancies in the state of environmental components with the requirements of national and international standards
	SPC -6.2 Capable of developing programs for monitoring natural complexes under conditions of man-made loads and programs for environmental rehabilitation of territories

3. PLACE OF PRACTICE IN THE STRUCTURE OF HIGHER EDUCATION PROGRAM

"Pre-graduate practice" refers to the compulsary part.

Within the framework of the educational program, students also master disciplines and/or other practices that contribute to achieving the planned learning outcomes based on the results of the "Pre-graduate practice".

Table 3.1. List of components of higher education program contributing to the achievement of the planned learning outcomes based on the results of the internship

Code	Competence	Previous Disciplines	Subsequent Disciplines
GC -1	able to carry out a critical analysis of problem situations based on a systematic approach, to develop a strategy of actions.	Методология научного творчества / Methodology of scientific creativity	Pre-graduate practice
GC -2	able to manage the project at all stages of its life cycle.	Экологическое проектирование промышленных объектов /	Pre-graduate practice

		Environmental design of industrial facilities	
GC -3	able to organize and manage the work of the team, developing a team strategy to achieve the goal	Методология научного творчества / Methodology of scientific creativity	Pre-graduate practice
GC -4	able to apply modern communication technologies, including in a foreign language(s) for academic and professional interaction	Foreign (Russian) language/ Иностранный (русский) язык Modem problems of Ecology / Современные проблемы экологии	Pre-graduate practice
GC -5	able to analyze and take into account the diversity of cultures in the process of intercultural interaction	Философские проблемы естествознания / Philosophical problems of nature science Современные проблемы экологии и природопользования / Modern probems of ecology and nature manegement Международное сотрудничество в области охраны окружающей среды / International collaboration in invironmental protection Устойчивое развитие / Sustainable development Методология научного творчества / Methodology of scientific creativity	Pre-graduate practice
GC -6	able to determine and implement the priorities of his own activities and ways to improve it based on self-assessment..	Философские проблемы естествознания / Philosophical problems of nature science Методология научного творчества / Methodology of scientific creativity	Pre-graduate practice
GC -7	Capable of using digital technologies and methods of searching, processing, analyzing, storing and presenting information (in the field of ecology and nature management) in the digital economy and modern corporate information culture	Компьютерные технологии и статистические методы в экологии и природопользовании / IT in ecology and nature management Методология научного творчества / Methodology of scientific creativity	Pre-graduate practice

GPC -1	Able to use philosophical concepts and methodology of scientific knowledge in the study of various levels of organization of matter, space and time.	Философские проблемы естествознания / Philosophical problems of nature science Методология научного творчества / Methodology of scientific creativity	Pre-graduate practice
GPC -2	Able to use special and new sections of ecology, geoecology and nature management in solving research and applied problems of professional activity.	Современные проблемы экологии и природопользования / Modern probems of ecology and nature manegement HSE менеджмент / HSE-management Методы мониторинга экологической безопасности природопользования / Methods of monitoring environmental safety of nature management / Methods of monitoring environmental safety of nature management / Methods of monitoring environmental safety of nature management Мониторинг природно-техногенных систем / Monitoring of natural and man-made systems Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment Ландшафтное планирование / Landscape planning Региональная геоэкологическая оценка территорий / Regional geoecological assessment of territories	Pre-graduate practice
GPC -3	Able to apply environmental research methods to solve research and applied problems of professional activity.	Методы мониторинга экологической безопасности природопользования / Methods of monitoring environmental safety of nature management Мониторинг природно-техногенных систем / Monitoring of natural and man-made systems	Pre-graduate practice

GPC -4	Able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management.	HSE менеджмент / HSE-management Международные стандарты управления качеством окружающей среды / International Environmental Quality Management Standards	Pre-graduate practice
GPC -5	Able to solve the problems of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies	Компьютерные технологии и статистические методы в экологии и природопользовании / IT in ecology and nature management Информационные технологии в природопользовании / Information technologies in nature management	Pre-graduate practice
GPC -6	Able to design, represent, protect and disseminate the results of their professional activities, including research.	Методология научного творчества / Methodology of scientific creativity	Pre-graduate practice
SPC-1	**SPC-1** Ability to formulate problems, objectives and methods of scientific research, generalize the results obtained, formulate conclusions and practical recommendations based on the research results	Методология научного творчества / Methodology of scientific creativity HSE менеджмент / HSE-management Экологическое проектирование промышленных объектов / Environmental design of industrial facilities Современные методы и технологии защиты окружающей среды / Modern methods and technologies of environmental protection Комплексная оценка природных и производственных потенциалов территорий / Comprehensive assessment of natural and industrial potentials of territories Информационные технологии в природопользовании / Information technologies in nature management	Pre-graduate practice

SPC - 2	The ability to creatively use knowledge of fundamental and applied sections of special disciplines in production and technological activities	Сертификация сырья, производственных процессов и продукции по международным экологическим требованиям / Certification of raw materials, production processes and products in accordance with international environmental requirements Радиоэкологическая безопасность территорий / Radioecological safety of territories Экологическое проектирование промышленных объектов / Environmental design of industrial facilities Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment Ландшафтное планирование / Landscape planning Управление минерально-сырьевым комплексом / Management of the mineral resource complex Комплексная оценка природных и производственных потенциалов территорий / Comprehensive assessment of natural and industrial potentials of territories Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste Экология и здоровье населения / Ecology and public health	Pre-graduate practice
SPC - 3	**SPC -3** Mastery of the basics of design, expert-analytical activities and research using modern approaches and methods, equipment and computing systems	Экологическое проектирование промышленных объектов / Environmental design of industrial facilities Хранение, переработка и утилизация отходов / Storage,	Pre-graduate practice

		processing and disposal of waste Информационные технологии в природопользовании / Information technologies in nature management Международные стандарты управления качеством окружающей среды / International Environmental Quality Management Standards Управление минерально-сырьевым комплексом / Management of the mineral resource complex	
SPC - 4	Is able to use modern methods of processing and interpretation of environmental information when conducting industrial research	Компьютерные технологии и статистические методы в экологии и природопользовании / IT in ecology and nature management Информационные технологии в природопользовании / Information technologies in nature management Международные стандарты управления качеством окружающей среды / International Environmental Quality Management Standards Управление минерально-сырьевым комплексом / Management of the mineral resource complex	Pre-graduate practice
SPC - 5	**SPC -5** Capable of developing standard environmental protection measures and assessing the impact of planned structures or other forms of economic activity on the environment.	Сертификация сырья, производственных процессов и продукции по международным экологическим требованиям / Certification of raw materials, production processes and products in accordance with international environmental requirements Радиоэкологическая безопасность территорий / Radioecological safety of territories HSE менеджмент / HSE-management	Pre-graduate practice

		Экологическое проектирование промышленных объектов / Environmental design of industrial facilities Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste Международные стандарты управления качеством окружающей среды / International Environmental Quality Management Standards Управление минерально-сырьевым комплексом / Management of the mineral resource complex Современные методы и технологии защиты окружающей среды / Modern methods and technologies of environmental protection	
SPC - 6	Able to diagnose problems of nature protection, develop practical recommendations for its protection and sustainable development	Методы мониторинга экологической безопасности природопользования / Methods of monitoring environmental safety of nature management Мониторинг природно-техногенных систем / Monitoring of natural and man-made systems Современные методы и технологии защиты окружающей среды / Modern methods and technologies of environmental protection Комплексная оценка природных и производственных потенциалов территорий / Comprehensive assessment of natural and industrial potentials of territories	Pre-graduate practice

4. PRACTICE VOLUME

The total workload of the «Pre-graduate practice» is 12 ECTS points (432 ac.h.).

5. PRACTICE CONTENT

Table 5.1. Practice content *

Name of practice section	Contents of the section (topics, types of practical activities)	Workload, ac.h.
Section 1. Organizational and preparatory	Receiving an assignment for an internship from a manager, receiving advice on internships	2
	Instruction on labor protection and fire safety	2
	Choice of research methodology	20
	Drawing up a schedule of work on the study	20
Section 2. Main	Preparation of a literature review on the topic of research using domestic and foreign literature	80
	Organization and conduct of research on the problem, collection of empirical data and their interpretation	160
	Writing a scientific article on the research problem	106
	Presentation at a scientific conference on the problem of research	20
Preparation of a practice report		20
Preparation for defense and defense of the practice report		2
	Total:	**432**

6. LOGISTICS AND TECHNICAL SUPPORT FOR PRACTICE

Classroom for Academic Activity Type	Classroom equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline (if necessary)
Lecture	A classroom for lecture-type classes, equipped with a set of specialized furniture; board (screen) and technical means of multimedia presentations.	Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, Stable wireless Internet connection. Software: Microsoft Windows, MS Office / Office 365, MS Teams, Chrome (latest stable release), Skype
Seminar	A classroom for conducting seminar-type classes, group and individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and technical means for multimedia presentations.	
For independent work of students	A classroom for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to the electronic information and educational environment.	

7. PRACTICE METHODS

The "Pre-graduate practice" can be conducted both in the structural divisions of the RUDN or in organizations in Moscow (stationary), and at bases located outside Moscow (field).

The practice on the basis of an external organization (outside of the RUDN) is carried out on the basis of a corresponding contract, which specifies the terms, place and conditions of the practice in the base organization.

The terms of the internship correspond to the period specified in the calendar training schedule of the OP HE. The terms of the internship can be adjusted in coordination with the Department of Educational Policy and the Department of Organization of Practices and Employment of Students at the RUDN..

8. RECOMMENDED SOURCES FOR COURSE STUDIES

MAIN READING(SOURCES):

1. Dangerous natural processes : textbook / M. V. Bedilo, A. G. Zavorotny, A. N. Nerovnykh [et al.] / 2nd ed. reprint. and additional – M. : Academy of GPS of the Ministry of Emergency Situations of Russia, 2020. – 308 p. https://academygps.ru/upload/Library_files/fragments/13.pdf #:~:text

2. Sokolov L.I. Waste Management, -M: Infra-Engineering, 2018, ISBN: 978-5-9729-0246-0; Electronic resource: https://avidreaders.ru/book/upravlenie-othodami-waste-management.html

3. Khaustov A.P., Redina M.M. Rationing and reduction of environmental pollution. Moscow: Yurayt, 2022. – 483 p. - Presented at the UNIBC RUDN and available on the website of the Yurayt publishing house at: https://biblio-online.ru/viewer/normirovanie-i-snizhenie-zagryazneniya-okruzhayuschey-sredy-432790 ?share_image_id=#page/1

ADDITIONAL (OPTIONAL) READING (SOURCES):

1. Scientific work. New rules of registration : bibliographic apparatus of scientific, research and creative works (GOST 7.80-2000, GOST 7.32-2001, GOST 7.82-2001, GOST 7.1-2003, GOST R 7.0.5-2008, GOST R 7.0.12-2011) : practical guide / E. E. Protopopova ; scientific ed.: PhD. O. A. Yelkina . Moscow : [Litera], 2014 .? 61, [2] S. ; 20. Series 'Modern Library Bibliogr.: pp. 60-61*INTERNET-(BASED) SOURCES:*

1. Learning toolkits for self- studies in the RUDN LMS TUIS:

- Электронно-библиотечная система РУДН – ЭБС РУДН http://lib.rudn.ru/MegaPro/Web
- ЭБС «Университетская библиотека онлайн» http://www.biblioclub.ru
- ЭБС Юрайт http://www.biblio-online.ru
- ЭБС «Консультант студента» www.studentlibrary.ru
- ЭБС «Лань» http://e.lanbook.com/
- ЭБС «Троицкий мост»

2. Databases and search engines:

- electronic fund of legal and normative-technical documentation http://docs.cntd.ru/

- Yandex search engine https://www.yandex.ru/
- Google search engine https://www.google.ru/
- abstract database SCOPUS http://www.elsevierscience.ru/products/scopus/

Scientific full-text databases.

- The list of databases is in alphabetical order with a description of each resource and a link. The collection of electronic resources UNIBTS (NB) contains:
- □ universal databases of world-famous publishers and electronic information providers for all scientific fields: Cambridge Journals, Oxford Journals, JSTOR, ScienceDirect "Freedom Collection, PROQUEST DISSERTATIONS AND THESES GLOBAL, Springer Journals, Taylor & Francis Online, Wiley Online Library, etc.
- □ specialized databases for specific fields of knowledge: CASC, IEL IEEE, INSPEC, Reaxys/RMC, IOPSCIENCE, MathSciNET, Pathway Studio, Royal Society of Chemistry, Nature, Science online, zbMATH journals, scientific protocols and scientific materials in the field of physical sciences and engineering by Springer Protocols and Springer Materials, Questel Orbit patents, etc.
- □ Open access full-text databases rigorously rated by professional experts: ScienceDirect Open, Oxford Open, Palgrave Open, De Gruyter Online Open, Sage Open, Springer Open, Taylor & Francis Online
- □ archives of scientific articles from Western publishers: AGU (Wiley), Annual Reviews, Cambridge University Press, IOP Publishing, Oxford University Press, Nature Publishing Group, Royal Society of Chemistry, SAGE Publications, Taylor and Francis, The American Association for the Advancement of Science
- □ Mendeley is an international scientific social network that allows you to find like-minded scientists, create scientific associations and study trends in modern research, combine information on the user's personal computer, forming your own collection of full-text scientific papers for distribution and citation, provides an opportunity for communication, facilitates establishing contacts with colleagues who deal with similar topics. Mendeley users are university scientists from all over the world: Stanford, Harvard, Oxford, Michigan, Cambridge, etc.

It is recommended to use *scientometric databases* when choosing a topic for scientific research and for the initial selection of information. Bibliographic and abstract scientometric databases contain tools for tracking the citation of articles published in scientific journals. The citation level of a scientific article is an indicator of relevance, significance and interest in this topic. The journals presented in the database serve as a guide when choosing publications for their own scientific publications.

The website of epy RUDN Library here are presented presents the following scientometric databases:

□ Web of Science and SCOPUS - universal international scientometric databases

□ InCites, SciVal - tools for analyzing world science and developing a development strategy

□ Google Academy - a search engine for scientific publications with the ability to navigate to full texts and article citation indicators

□ RSCI on the eLibrary.ru platform is a national information and analytical system that accumulates more than 12 million publications by Russian scientists.

You can work with databases from any computer of the University. Remote access is organized to some electronic platforms. Detailed information about each resource can be obtained from the consultants of the RUDN Library reading rooms. Electronic databases (DB) will help to significantly reduce the time spent on searching for relevant information, and full-text databases will allow you to immediately get acquainted with the selected materials.

*Educational and methodological materials for internship, filling out a diary and preparing an internship report *:*

1. Safety rules for the passage of the " Research work of a master's student " (initial briefing).
2. The general arrangement and principle of operation of technological production equipment used by students during their internship; flow charts and regulations, etc. (if necessary).
3. Guidelines for filling in a diary by students and preparing a practice report.

8. EVALUATION MATERIALS AND SCORE-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCES ON THE RESULTS OF PRACTICE

Evaluation materials and a point-rating system* for evaluating the level of competencies (part of competencies) based on the results of the “Research work of a master's student” are presented in the Appendix to this Internship Program.

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