

**Federal State Autonomous Educational Institution of Higher Education
"Peoples' Friendship University of Russia"**

Institute of Environmental Engineering

(наименование основного учебного подразделения (ОУП)-разработчика ОП ВО)

COURSE SYLLABUS

**Геохимические методы оценки окружающей среды / Geochemical methods
of environmental assessment**

(наименование дисциплины/модуля)

Recommended by the Methodological Council for the Education Field:

05.04.06 Ecology and nature management

(код и наименование направления подготовки/специальности)

**The discipline is mastered within the framework of the main professional higher
education program:**

УПРАВЛЕНИЕ ПРИРОДОПОЛЬЗОВАНИЕМ / NATURE MANAGEMENT

(наименование (профиль/специализация) ОП ВО)

1. COURSE GOALS

The purpose of the discipline is to get acquainted with modern theoretical basics and best international practice of a geochemical methods of environmental assessment and applications in the environmental protection and management.

2. LEARNING OUTCOMES

The mastering of the discipline "Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment" is aimed at the formation of the following competencies (parts of competencies) in students:

Table 2.1. List of competencies formed by students during the development of the discipline (LEARNING OUTCOMES)

Code	Competence	Indicators of competence achievement (within the framework of this discipline)
ОПК-2 GPC-2	Способен использовать специальные и новые разделы экологии, геоэкологии и природопользования при решении научно-исследовательских и прикладных задач профессиональной деятельности. Able to use special and new sections of ecology, geoeology and nature management in solving research and applied tasks of professional activity	ОПК-2.1 Знает основы экологии, геоэкологии, экономики природопользования и экономики замкнутого цикла, а также экологического менеджмента GPC-2.1 Knows the basics of ecology, geoeology, environmental economics and closed-loop economics, as well as environmental management
ПК-2 SPC-2	Способность творчески использовать в производственно-технологической деятельности знания фундаментальных и прикладных разделов специальных дисциплин The ability to creatively use knowledge of fundamental and applied sections of special disciplines in production and technological activities	ПК-2.1 Владеет навыками применения передовых достижений науки для выбора и внедрения наилучших доступных технологий (НДТ) SPC-2.1 Has the skills of applying advanced scientific achievements to select and implement the best available technologies (BAT)

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline "Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment" refers to Compulsory Disciplines of the Higher Education Program.

Within the framework of the higher education program, students also master other disciplines and/or practices that contribute to expected learning outcomes of the discipline "Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment".

Table 3.1. List of Higher Education Program components that contribute to expected learning outcomes

Code	Competence	Previous Disciplines (Modules)	Subsequent Disciplines (Modules)
ОПК-2 GPC-2	Способен использовать специальные и новые разделы экологии, геоэкологии и природопользования при решении научно-исследовательских и прикладных задач профессиональной деятельности. Able to use special and new sections of ecology, geocology and nature management in solving research and applied tasks of professional activity	Современные проблемы экологии и природопользования / Modern problems of ecology and nature management HSE менеджмент / HSE-management Методы мониторинга экологической безопасности природопользования / Methods of monitoring environmental safety of nature management Мониторинг природно-техногенных систем / Monitoring of natural and man-made systems	Ландшафтное планирование / Landscape planning Региональная геоэкологическая оценка территорий / Regional geocological assessment of territories Производственная практика / Production practice
ПК-2 SPC-2	Способность творчески использовать в производственно-технологической деятельности знания фундаментальных и прикладных разделов специальных дисциплин 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	Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste Экология и здоровье населения / Ecology and public health Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment Ландшафтное планирование / Landscape planning Управление минерально-сырьевым комплексом / Management of the mineral resource complex

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

Workload of the course «Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment» is 2 ECTS.

Table 4.1. Types of academic activities during the period of the HE program mastering

Вид учебной работы	TOTAL	Semesters			
		1	2	3	4
Contact academic hours	34			34	
Incl.:					

Вид учебной работы	TOTAL	Semesters			
		1	2	3	4
Lectures					
Lab work					
Seminars	34			34	
<i>Self-study</i>	15			15	
<i>Evaluation and assessment</i>	23			23	
Total workload	Ac.hours	72		72	
	ECTS	2		2	

5. COURSE CONTENTS

Table 5.1. The content of the discipline (module) by type of academic work

Name of the discipline section	Content of the section (topics)	Type of academic activity*
Introduction.	The subject, content and tasks of ecology and geochemistry of urban landscapes. The subject of study, tasks and role of ecology and geochemistry of urban landscapes in the ecology of the city. The role of landscapes in the ecology of the city.	Lectures, Seminars
Elementary landscapes of urbanized territories.	Elementary landscapes. Three main groups of elementary landscapes (facies): eluvial, subaquial, supraquial. Additional facies groups.	Lectures, Seminars
Local landscapes (localities) of urbanized territories and principles of their typology	Definition of concepts, indexes of local landscapes. Their main characteristics. Geochemical characteristics.	Lectures, Seminars
Geochemical principles of ecological and geochemical systematics of cities	The main taxonomic units of geochemical systematics of cities. Detachments, ranks, groups and types, families, classes, genera of cities	Lectures, Seminars
Ecological and geochemical assessments of the state of urban pollution	Ecological and geochemical assessments of the state of urban pollution Ecological and geochemical assessments of the state of urban pollution.	Lectures, Seminars
Research methods. Field landscape and geochemical studies.	Research methods. Field landscape and geochemical studies. Processing of field research materials: Processing of analytical data. Landscape-geochemical maps.	Lectures, Seminars

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Classroom for Academic Activity Type	CLASSROOM EQUIPMENT	Specialized learning, laboratory equipment, software and materials for the mastering the course
Lecture	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical means of multimedia presentations.	-
Seminars	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	-
Self-studies	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to an electronic information and educational environment.	-

7. RECOMMENDED SOURCES FOR COURSE STUDIES

Main reading:

1. Li Y. H. A compendium of geochemistry //A Compendium of Geochemistry. – Princeton University Press, 2022. URL: <https://www.degruyter.com/document/doi/10.1515/9780691229515/html>

Additional sources:

1. Nakashima S. et al. Geochemistry and the origin of life: From extraterrestrial processes, chemical evolution on earth, fossilized life's records, to natures of the extant life //Life. – 2018. – Т. 8. – №. 4. – С. 39.
2. Deutsch W. J. Groundwater geochemistry: fundamentals and applications to contamination. – CRC press, 2020. URL: <https://www.taylorfrancis.com/books/mono/10.1201/9781003069942/groundwater-geochemistry-william-deutsch>
3. Pourret O. et al. Open Access publishing practice in geochemistry: overview of current state and look to the future //Heliyon. – 2020. – Т. 6. – №. 3. – С. e03551.

Internet-sources:

1. Electronic library system of the RUDN and third-party electronic library systems, to which university students have access on the basis of concluded contracts:
 - electronic library system of the RUDN University <http://lib.rudn.ru/MegaPro/Web>
 - electronic library system «Университетская библиотека онлайн» <http://www.biblioclub.ru>
 - electronic library system Юрайт <http://www.biblio-online.ru>
 - electronic library system «Консультант студента» www.studentlibrary.ru

- electronic library system «Лань» <http://e.lanbook.com/>
- electronic library system «Троицкий мост»

2. Databases and search engines:

- electronic fund of legal and regulatory and 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/>
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*Educational and methodological materials for independent work of students during the development of the discipline/ module *:*

1. A course of lectures on the discipline "Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment".

* - all educational and methodological materials for independent work of students are placed in accordance with the current procedure on the discipline page in the Telecommunication educational and Information System!

8. MID-TERM ASSESSMENT AND EVALUATION TOOLKIT

Evaluation materials and a point-rating system* for assessing the level of competence formation (part of competencies) based on the results of mastering the discipline "Геохимические методы оценки окружающей среды / Geochemical methods of environmental assessment" are presented in the Appendix to this Work Program of the discipline.

* - evaluation toolkit and ranking system are formed on the basis of the requirements of the relevant local regulatory act of the RUDN (regulations / order).

DEVELOPER:

Professor of the ERNM
Department



Stanis E.V.

Position, Department

Signature

Name

HEAD OF THE DEPARTMENT:

Head of the Department of
Environmental Safety and
Product Quality Management
Department



Savenkova E.V.

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Name

HAED OF THE HIGHER EDUCATION PROGRAM:

Professor of the Department of
Environmental Safety and
Product Quality Management



Redina M.M.

Position, Department

Signature

Name