**PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA NAMED AFTER PATRICE LUMUMBA**

**Institute of Environmental Engineering**

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

# COURSE SYLLABUS

## Environmental statistics

(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:**

Economics of natural resources management

(наименование (профиль/специализация) ОП ВО)

**2026**

## 1. COURSE GOALS

The objectives of the discipline are the formation of competencies including:

- Ability to apply modern computer technologies in collecting, storing, processing, analyzing and transmitting information and for solving research and production-technological problems of professional activity
- The ability to use in-depth knowledge of legal and ethical norms in assessing the consequences of their professional activities, the development and implementation of socially significant projects and to use in practice skills and abilities in the organization of research and scientific-production work, in the management of the scientific team
- Possession of the basics of design, expert and analytical activities and research performance using modern approaches and methods, equipment and computing systems
- Ability to use modern methods of processing and interpreting environmental information in scientific and industrial research.

## 2. LEARNING OUTCOMES

The mastering of the discipline "Environmental statistics" 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) |
|---|---|---|
| **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 |
| **SPC -4** | Able to use modern methods of processing and interpreting environmental information in 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 results of studies in terms of compliance with safety and performance indicators |
| | | **SPC-4.3** Has the skills to conduct control and supervisory activities based on modern methods of processing environmental information |
| SPC-5 | Able to develop standard environmental measures and assess the impact of planned facilities or other forms of economic activity on the environment | SPC-5.1 Able to develop and plan the implementation of standard environmental measures, taking into account international practice and the requirements of national legislation |
| | | SPC-5.2. Has the skills to assess 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 the environmental |

| Code | Competence | Indicators of competence achievement (within the framework of this discipline) |
|---|---|---|
| | | modernization of enterprises, the introduction of BAT, the organization of environmental monitoring, accounting and reporting |
| **SPC-6** | Able to develop standard environmental measures and assess the impact of planned facilities or other forms of economic activity on the environment | **SPC-6.1** Capable of detecting inconsistencies in the state of environmental components with the requirements of national and international standards |
| | | **SPC-6.2** Able to develop programs for monitoring natural complexes under conditions of technogenic loads and programs for environmental rehabilitation of territories |

## 3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline " Environmental statistics " 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 "Environmental statistics".

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

| Code | Competence | Previous Disciplines (Modules) | Subsequent Disciplines (Modules) |
|---|---|---|---|
| **GC-1** | Able to carry out a critical analysis of problem situations based on a systematic approach, to develop a strategy of actions | IT in ecology and natural resources management / Компьютерные технологии в управлении природопользованием<br>Management of natural resources / Менеджмент природных ресурсов | Environmental noms for sustainability / Экологические нормы для устойчивого развития<br>Учебная практика / Educational practice<br>Производственная практика / Production practice<br>Научно-исследовательская работа / Research work<br>НИР / Research work<br>Преддипломная практика / Pre-graduate practice |
| **SPC -4** | Able to use modern methods of processing and interpreting environmental information in scientific and industrial research. | Industrial nature management and economics / Промышленное природопользование и экономика<br>Standards of environmental management and occupational safety / Стандарты экологического | Wastes: Landfills, Processing and Recycling / Отходы: хранение, захоронение, рециклинг<br>Surface water quality: modeling and management / Качество поверхностных вод: моделирование и менеджмент<br>Базовая компонента<br>Учебная практика / Educational practice<br>Вариативная компонента |

| Code | Competence | Previous Disciplines (Modules) | Subsequent Disciplines (Modules) |
|---|---|---|---|
| | | менеджмента и охраны труда<br>Occopational safety and HSE-audit / Охрана труда и HSE-аудит | Производственная практика / Production practice<br>Научно-исследовательская работа / Research work<br>НИР / Research work<br>Преддипломная практика / Pre-graduate practice |
| **SPC-5** | Able to develop standard environmental measures and assess the impact of planned facilities or other forms of economic activity on the environment | Estimations of natural resources / Оценки природных ресурсов<br>Management of environmental-economic risks / Управление эколого-экономическими рисками<br>Учебная практика / Educational practice<br>Научно-исследовательская работа / Research work | Modern remediation technologies / Современные технологии ремедиации<br>Management of water resources / Управление водными ресурсами<br>Environmental-economic aspects of environmental projects / Эколого-экономические аспекты экологических проектов<br>Wastes: Landfills, Processing and Recycling / Отходы: хранение, захоронение, рециклинг<br>Surface water quality: modeling and management / Качество поверхностных вод: моделирование и менеджмент<br>Производственная практика / Production practice<br>НИР / Research work<br>Преддипломная практика / Pre-graduate practice |
| **SPC-6** | Able to develop standard environmental measures and assess the impact of planned facilities or other forms of economic activity on the environment | Management of natural resources / Менеджмент природных ресурсов<br>Modern technologies for nature protection / Современные технологии защиты окружающей среды<br>Industrial nature management and economics / Промышленное природопользование и экономика<br>Economic aspects of natural resources management / Экономические аспекты природопользования | Modern remediation technologies / Современные технологии ремедиации<br>Management of energy resources / Менеджмент ресурсов энергетики<br>Environmental noms for sustainability / Экологические нормы для устойчивого развития<br>Wastes: Landfills, Processing and Recycling / Отходы: хранение, захоронение, рециклинг<br>Surface water quality: modeling and management / Качество поверхностных вод: моделирование и менеджмент<br>Industrial safety / Промышленная безопасность<br>Simulation and prevention of accidents / Моделирование и предупреждение аварий |

| Code | Competence | Previous Disciplines (Modules) | Subsequent Disciplines (Modules) |
|---|---|---|---|
| | | Standards of environmental management and occupational safety / Стандарты экологического менеджмента и охраны труда<br>Occupational safety and HSE-audit / Охрана труда и HSE-аудит | Учебная практика / Educational practice<br>Производственная практика / Production practice<br>Научно-исследовательская работа / Research work<br>НИР / Research work<br>Преддипломная практика / Pre-graduate practice |

## 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

Workload of the course «Environmental statistics» 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* | | *17* | | | | |
| Incl.: | | | | | | |
| Lectures | | | | | | |
| Lab work | | | | | | |
| Seminars | | 17 | 17 | | | |
| *Self-study* | | *28* | *28* | | | |
| *Evaluation and assessment* | | *27* | *27* | | | |
| **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. | Environment as an object of statistical observation. Sources of statistical data in the sphere of environmental protection, environmental safety and nature management | Lectures, Seminars |
| State statistical observation | State statistical observation. Systems of accounting and reporting. Theoretical basics of environmental statistics. Characteristics of natural resources as a part of national welfare. System of indicators of statistics of natural resources. Environment and Natural Resources Statistics | Lectures, Seminars |
| Environmental statistics for enterprises | Statistical observation in the field of environmental management and sustainable | Lectures, Seminars |

| | | |
|---|---|---|
| | development at the level of enterprises and companies. Reporting formats. Use of Observations | |
| Methods of statistical data processing and analyses | Methods of statistical processing and data analysis. Correlation-regression analysis. Basic concepts of correlation and regression analysis. The main tasks and prerequisites for the use of the correlation-regression method. Correlation-regression analysis of natural resources of the Russian Federation | Lectures, Seminars |
| Applied data analyses | Statistical methods and data analysis for processing the results of environmental monitoring. Classifications in ecological geochemistry. Data analysis in environmental economics | 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** |
|---|---|---|
| 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:*

Ledashcheva T. N., Pinaev V. E. Computer Processing of Statistic Data: Practice. – 2021.

*Additional sources:*

1. Ledashcheva T., Pinaev V. Cognitive modeling as a means of assessment and formation of systemic thinking //E3S Web of Conferences. – EDP Sciences, 2021. – T. 265. – C. 07009.

2. Ledashcheva T., Pinaev V. Application of cognitive modeling in project management //International Multidisciplinary Scientific GeoConference SGEM (см. в книгах). – 2018. – Т. 18. – №. 1.5. – С. 11-18.

*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/
- ……..

*Educational and methodological materials for independent work of students during the development of the discipline/ module *:*

1. A course of lectures on the discipline "Environmental statistics".

* - 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 "Environmental statistics" 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:**

| Assoc. Prof. of the ESandPQM Department | | **Ledascheva T.N.** |
|---|---|---|
| Position, Department | Signature | Name |

**HEAD OF THE DEPARTMENT:**

| Head of the Department of Environmental Safety and Product Quality Management | | **Savenkova E.V.** |
|---|---|---|
| Department | Signature | Name |

**HAED OF THE HIGHER EDUCATION PROGRAM:**

| Professor of the Department of Environmental Safety and Product Quality Management | | **Redina M.M.** |
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| Position, Department | Signature | Name |