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

**Institute of Environmental Engineering**

educational division (faculty/institute/academy) as higher education programme developer

## **COURSE SYLLABUS**

### **Хранение, переработка и утилизация отходов / Waste: Storage, processing and disposal**

(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 course is aimed on forming of following competencies: to possess the modern field of knowledge and to be able to use it in scientific, practical and educational purposes. To know modern methods of environment condition impact on human health and ecosystems assessment of the world and natural phenomena; have knowledge in ecology, nature exploitation. The course is designed to provide knowledge on the implementation of activities for the collection, use, transportation and disposal, decontamination and disposal of hazardous and household waste, the existing material and technical base.

## 2. LEARNING OUTCOMES

The mastering of the discipline "Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste" 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)
<b>ПК-2 SPC-2</b>	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	<b>GPC -3.1</b> Knows the principles and methods of environmental monitoring of environmental components
<b>ПК-3 SPC-3</b>	Владение основами проектирования, экспертно-аналитической деятельности и выполнения исследований с использованием современных подходов и методов, аппаратуры и вычислительных комплексов Knowledge of the basics of design, expert-analytical activity and research using modern approaches and methods, equipment and computer systems	<b>ПК-3.1</b> Способен планировать внедрение современных подходов и методов, аппаратуры и вычислительных комплексов для решения задач в профессиональной области <b>SPC-3.1</b> Is able to plan the implementation of modern approaches and methods, equipment and computer systems for solving problems in the professional field <b>ПК-3.2</b> Владеет основами проектирования и экспертно-аналитической деятельности <b>SPC-3.2</b> Owns the basics of design and expert-analytical activity
<b>ПК-5 SPC-5</b>	Способен разрабатывать типовые природоохранные мероприятия и проводить оценку воздействия планируемых сооружений или иных форм хозяйственной деятельности на окружающую среду	<b>ПК-5.1</b> Способен разрабатывать и планировать внедрение типовых природоохранных мероприятий с учетом международной практики и требований национального законодательства <b>SPC-5.1</b> Is able to develop and plan the implementation of standard environmental

<b>Code</b>	<b>Competence</b>	<b>Indicators of competence achievement (within the framework of this discipline)</b>
	<b>SPC-5</b> Is able to develop standard environmental protection measures and assess the impact of planned structures or other forms of economic activity on the environment	measures taking into account international practice and the requirements of national legislation

### 3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline "Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste" 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 "Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste".

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

<b>Code</b>	<b>Competence</b>	<b>Previous Disciplines (Modules)</b>	<b>Subsequent Disciplines (Modules)</b>
<b>ПК-2 SPC-2</b>	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	Экологическое проектирование промышленных объектов / Environmental design of industrial facilities	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
<b>ПК-3 SPC-3</b>	Владение основами проектирования, экспертно-аналитической деятельности и выполнения исследований	Экологическое проектирование промышленных объектов / Environmental design of industrial facilities Информационные технологии в природопользовании /	Производственная практика / Production practice Преддипломная практика Управление минерально-сырьевым

Code	Competence	Previous Disciplines (Modules)	Subsequent Disciplines (Modules)
	использованием современных подходов и методов, аппаратуры и вычислительных комплексов Knowledge of the basics of design, expert-analytical activity and research using modern approaches and methods, equipment and computer systems	Information technologies in nature management Дисциплины по выбору Международные стандарты управления качеством окружающей среды / International Environmental Quality Management Standards	комплексом / Management of the mineral resource complex Научно-исследовательская работа в семестре, включая курсовые работы / Research work in the semester, including term papers
SPC-5	Able to develop standard environmental measures and assess the impact of planned facilities 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 Экологическое проектирование промышленных объектов / Environmental design of industrial facilities Современные методы и технологии защиты окружающей среды / Modern methods and technologies of environmental protection	Международные стандарты управления качеством окружающей среды / International Environmental Quality Management Standards Управление минерально-сырьевым комплексом / Management of the mineral resource complex

#### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

Workload of the course «Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste» is 3 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
<i>Contact academic hours</i>	17				
Incl.:					
Lectures					
Lab work					
Seminars	17			17	
<i>Self-study</i>	43			43	
<i>Evaluation and assessment</i>	12			12	
<b>Total workload</b>	Ac.hours	<b>72</b>		<b>72</b>	
	ECTS	<b>2</b>		<b>2</b>	

## 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*
The problem of waste	The concept of waste. Stability and safety of the environment. Stability and sustainability of ecosystems to pollution. The concept of ecosystem's stability. Cycling of matter - the important principle of sustainable ecosystems. Biogeochemical cycles of carbon, hydrogen, oxygen, sulfur, phosphorus and metals. Self-purification capacity of the ecosystem: biotic and abiotic processes. The parameters of ecosystem stability	Seminars
Waste in the environment	The main types of waste, a brief description of the principles of waste classification. Processes for waste management (life cycle management). Organization of waste management. Documenting the activities of waste management. Certification of waste. Certification of hazardous waste	Seminars
Sources of solid waste. Wastewater	Processing of non-radioactive waste. Warehousing. Heat treatment. Sludge processing (electroplating, oil). Features recycling by industry. Integrated waste management system. Sources and processing of radioactive waste. Features of radioactive waste	Seminars
Processing, recycling and disposal of industrial waste.	Sources and types of pollution of the hydrosphere. Types of wastewater. Types of pollution of industrial waste water. Modern methods of treatment of waste water from industrial pollution. Agricultural and domestic effluents and methods of cleaning. Sewage sludge and methods of treatment and disposal. Biological methods. Methane fermentation. Composting. Vermiculation. Thermal methods. Hygiene requirements for the selection of the territory - the location site. The layout and arrangement of polygons. Ensuring security control polygons. Hygienic requirements to choosing	Seminars

		disposal of industrial waste (solid, powdered, pasty). Features dumping water soluble, liquid and combustible waste. Preventive and routine supervision of the polygons. Passport site	
Transportation hazardous waste.	of	The main hazards during transportation. Prevention and management of emergencies involving dangerous goods. Technical and organizational measures	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:*

1 Kharlamova M.D. Kurbatova A.I. Modern Technologies of Waste Management, Recycling and Environmental Protection. Moscow, RUDN University Publishing 2017 – 98 p. (RUDN library)

### *Additional sources:*

1. MOOCs Course on I-versity Platform University and Dr. Marianna Kharlamova: Practical Tools of Solid Waste Management & Environmental Damage Reducing <https://iversity.org/en/courses/practical-tools-of-solid-waste-management-environmental-damage-reducing>

2. MOOCs Course on Coursera Platform, by Federal Polytechnic School of Lausanne: Municipal Solid Waste Management in Developing <https://www.coursera.org/learn/solid-waste-management>

*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](http://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 "Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste".

\* - 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 "Хранение, переработка и утилизация отходов / Storage, processing and disposal of waste" 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

Position, Department



Signature

**Kharlamova M.D.**

Name

### **HEAD OF THE DEPARTMENT:**



Head of the Department of  
Environmental Safety and  
Product Quality Management

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Department

Signature

**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

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Position, Department



Signature

**Redina M.M.**

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Name