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**Federal State Autonomous Educational Institution of Higher Education
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

Regional and Municipal Waste Management Systems

course title

Recommended by the Didactic Council for the Education Field of:

08.04.01 Construction

05.04.06. Ecology and Environmental Management

field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

Environmental Engineering in Construction

higher education programme profile/specialisation title

2023 г.

1. OBJECTIVE OF THE DISCIPLINE

The purpose and objectives of the discipline: Formation of the theoretical foundations of waste management as a source of valuable secondary material resources and energy production. The principles of drawing up territorial schemes for waste management are studied, the duties and functions of regional operators are considered, the effectiveness of the introduction of an environmental fee as a regulatory tool for extended producer responsibility is analyzed. The training uses innovative learning technologies in the format of a business game and the development and protection of an industrial project, which allows you to form practical skills in the field of effective management of production and consumption waste.

2. REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Regional and municipal waste management systems" is aimed at developing the following competencies (parts of competencies) among students: **GPC-2e; PC-4**

Table 2.1. The list of competencies formed by students in the course of mastering the discipline (the results of mastering the discipline)

| Code | Competence | Competence achievement indicators (in the framework of discipline) |
|---------------|--|--|
| GPC-2e | Able to use special and new sections of ecology, geoecology and nature management in solving research and applied problems of professional activity. | GPC-2e.1 Has a systematic understanding of the theoretical and methodological foundations of environmental regulation |
| | | GPC-2e.2 Has the basic knowledge of the fundamental sections of biology in the amount necessary to master the basics in ecology and nature management |
| | | GPC-2e.3 Owns modern methods of obtaining and evaluating geochemical information for solving theoretical and practical problems of environmental geochemistry in the field of ecology and nature management in order to protect the environment |
| PC-4 | Able to develop design solutions and measures to ensure the safety of industrial and civil construction projects | PC-4.1 Able to develop standard environmental measures, monitor the state of the environment to ensure the safety of industrial and civil construction projects |
| | | PC-4.2 Possesses the skills of environmental design and preparation of special documentation at the pre-project stage of the project life cycle |
| | | PC-4.3 Capable of carrying out the necessary calculations for planning, modeling and forecasting the development of a territorial object |

3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF BP HE

The discipline "Regional and municipal waste management systems" refers to the elective component of block Б1.О.02.07.

As part of the EP VO, students also master other disciplines and / or practices that contribute to the achievement of the planned results of mastering the discipline “Regional and municipal waste management systems”.

Table 3.1. The list of components of the EP HE that contribute to the achievement of the planned results of the development of the discipline

| Code | Competence | Previous disciplines/modules, practices* | Subsequent disciplines/modules, practices* |
|---------------|---|--|--|
| GPC-2e | Able to use special and new sections of ecology, geocology and nature management in solving research and applied problems of professional activity. | Sustainable development of urban areas | |
| PC-4 | Able to develop design solutions and measures to ensure the safety of industrial and civil construction projects | Computer technologies and statistical methods in ecology and nature management | |

* - filled in in accordance with the matrix of competencies

4. SCOPE OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

The total labor intensity of the discipline "Regional and municipal systems of waste management" is **3 credit units (CE)**.

Table 4.1. Types of educational work by periods of Program mastering for FULL-TIME education

| Type of study work | Total, hours. | Terms | | | |
|---|---------------|-------|---|------------|---|
| | | 1 | 2 | 3 | 4 |
| <i>Contact work, hours</i> | 17 | | | 17 | |
| Lectures (L) | | | | | |
| Laboratory works (LW) | | | | | |
| Practical/seminar classes (SC) | 17 | | | 17 | |
| <i>Independent work of students, hours.</i> | 66 | | | 66 | |
| <i>Control (exam/test with assessment), hours</i> | 25 | | | 25 | |
| The total complexity of the discipline | hours. | | | 108 | |
| | Cr.un. | | | 3 | |

*Table 4.2. Types of educational work by periods of Program mastering for CORRESPONDENCE forms of education**

| Type of study work | Total, hours. | Terms | | | |
|----------------------------|---------------|-------|---|---|---|
| | | 1 | 2 | 3 | 4 |
| <i>Contact work, hours</i> | 4 | | | 4 | |
| Lectures (L) | | | | | |
| Laboratory works (LW) | | | | | |

| Type of study work | | Total, hours. | Terms | | | |
|---|--------|------------------|-------|---|------------|---|
| | | | 1 | 2 | 3 | 4 |
| Practical/seminar classes (SC) | | 4 | | | 4 | |
| <i>Independent work of students, hours.</i> | | 95 | | | 95 | |
| <i>Control (exam/test with assessment), hours</i> | | 9 | | | 9 | |
| The total complexity of the discipline | hours. | 108 | | | 108 | |
| | Cr.un. | 3 | | | 3 | |

5. CONTENT OF THE DISCIPLINE

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

| Name of the discipline section | Contents of the section (topic) | Type of study* |
|--|--|----------------|
| 1. WORLD EXPERIENCE IN THE WASTE MANAGEMENT. POSSIBLE SCENARIOS | Indicators of sustainable development in the field of waste management. Basic principles of waste management. World trends in the field of waste management. Experience of developed countries The main methods of integrated waste processing in the world. | L, S |
| 2. WASTE AS A SOURCE OF SECONDARY RESOURCES AND ENERGY | Goals and objectives of regional waste management programs, indicators of program implementation used, results of implementation. Short and long term programs. Regional features to be taken into account when developing programs. Waste composition. Analysis of the resource and energy potential of waste | L, S |
| 3. MECHANISMS FOR WASTE MANAGEMENT IMPROVING (CASE OF STUDY - RUSSIAN FEDERATION). | Improving the regulatory framework in the field of waste management. Environmental collection and extended liability of producers and importers of goods. Wastedisposalfee. | L, S |
| 4. INSTITUTE OF EXTENDED PRODUCER RESPONSIBILITY, ENVIRONMENTAL FEE | Hierarchy levels in the field of waste management. Minimization of waste generation - resource saving and low-waste technologies. Classification of municipal solid waste and organization of a separate collection system. | L, S |
| 5. REGIONAL & MUNICIPAL WASTE MANAGEMENT SCHEMES. | Territorial waste management schemes. Regional Operator Institute. Determination of waste streams generated in various industries and utilities. Directions of the waste management strategy: creating conditions for reducing the amount of waste; ensuring the growth of waste use volumes; creation of environmentally safe conditions for storage and disposal of waste. | L, S |
| 6. INTEGRATED SCHEMES FOR THE MSW PROCESSING | Complex of waste processing methods, focused on regional and industry applications. Use combinations of recycling, composting and incineration of waste. Flexibility of the waste management structure. Waste monitoring and control systems, Improving the technical level of waste processing and the creation and implementation of low-waste technologies. | L, S |

* - filled in only for full-time education: L - lectures; LW - laboratory work; S - seminars.

6. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE

Table 6.1. Material and technical support of discipline

| Auditorium type | Auditorium equipment | Specialized educational / laboratory equipment, software and materials for mastering the discipline (if necessary) |
|----------------------------------|--|--|
| Lecturehall | An auditorium for lecture-type classes, equipped with a set of specialized furniture; board (screen) and technical means of multimedia presentations. | |
| For independent work of students | 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 the IETS. | |

* - the audience for independent work of students must be specified

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATION SUPPORT OF THE DISCIPLINE

Mandatory literature:

1. 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>

2. Kharlamova M.D., Kurbatova A.I. Solid Wastes: Recycling Technologies, Control Methods, Monitoring, Ed. M. D. Kharlamova, 2nd ed., corrected. and additional - M.: Yurayt Publishing House, 2018, -311 p. (RUDN electronic library)

Additional literature

1. I. N. Zhmykhov, A. A. Chelnokov, K. K. Yurashchik, L. F. Yushchenko Waste management. Textbook, -465 C. Electronic resource: <https://www.litres.ru/a-a-chelnokov/obraschenie-s-othodami-37392195/>

Resources of the information and telecommunications network "Internet":

Internet sources

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:

- RUDN Electronic Library System (RUDN ELS) <http://lib.rudn.ru/MegaPro/Web>
- EL "University Library Online" <http://www.biblioclub.ru>
- EL "Yurayt" <http://www.biblio-online.ru>
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" <http://e.lanbook.com/>
- EL "Trinity Bridge"

2. Databases and search engines:

electronic foundation of legal and normative-technical documentation <http://docs.cntd.ru/>

- Yandex search engine [https:// www .yandex.ru/](https://www.yandex.ru/)

- Google search engine <https://www.google.ru/>
- Scopus abstract database <http://www.elsevier.com/locate/scopus/>

Educational and methodological materials for independent work of students when mastering the discipline are located on the discipline page in the TUIS RUDN University system: <https://esystem.rudn.ru/course/>

The training toolkit and guidelines for a student to do an internship, keep an internship diary and write an internship report:*

1. Safety regulations to do the internship (safety awareness briefing).
2. Machinery and principles of operation of technological production equipment used by students during their internship; process flow charts, regulations, etc. (if necessary).
3. Guidelines for keeping an internship diary and writing an internship report.

*The training toolkit and guidelines for the internship are placed on the internship page in the university telecommunication training and information system under the set procedure.

1. A course of lectures with electronic presentations and video materials on the discipline "Regional and municipal waste management systems".
2. Guidelines for completing assignments for seminars
3. Test materials for milestone certification
4. Questions to prepare for the exam

8. EVALUATION MATERIALS AND SCORE-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCES IN THE DISCIPLINE

Evaluation materials and a point-rating system* for assessing the level of competencies (parts of competencies) based on the results of mastering the discipline "Regional and municipal waste management systems" are presented in the Appendix to this Work Program of the discipline.

* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

DEVELOPER:

Ass. Professor

Kharlamova M.D

position, educational department

signature

name and surname.

BASIC TRAINING UNIT LEADER:

Department Chef

Savenkova E.V

position, educational department

signature

name and surname.

HEAD OF EDUCATIONAL DEPARTMENT:

Director of the Department
of Environmental Management



Kucher D.E.

educational department

signature

name and surname.

**HEAD OF
HIGHER EDUCATION PROGRAMME:**

Director of the Department
of Environmental Management



Kucher D.E.

position, educational department

signature

name and surname