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**Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
RUDN University**

Institute of Environmental Engineering

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

COURSE SYLLABUS

Environmental control and monitoring of urban environment

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

2024 г

1. OBJECTIVE OF THE DISCIPLINE

The purpose of the discipline «Environmental control and monitoring of urban environment» is to develop students' theoretical and practical knowledge, skills and abilities in the field of monitoring and forecasting environmental situations and risks in the management of various wastes.

This goal is achieved by solving the following tasks:

- conducting state, industrial and public control in the field of waste management;
- setting limits on waste disposal in accordance with environmental and hygienic standards;
- assess the environmental situation from the point of view of danger to the environment and human health;
- analyze environmental information, environmental and economic reporting and the implementation of operational waste management at the enterprise;
- monitor compliance with the environmental regulation system and the implementation of preventive measures to reduce risk and mitigate emergency indicators in the field of waste management.

2. REQUIREMENTS FOR THE RESULTS OF DISCIPLINE MASTERING

Mastering the discipline "Environmental control and monitoring of urban environment" is aimed at developing the following competencies (parts of competencies):

Table 2.1. The list of competencies acquired by the students during the mastery of the discipline (the results of the mastery of the discipline)

Code	Competencies	Competence achievement indicators (within this discipline)
PC-2	Able to diagnose environmental protection problems, develop standard environmental protection measures and practical recommendations for ensuring sustainable development and assess the impact of planned structures or other forms of economic activity on the environment	PC -2.1 Able to predict possible adverse changes in the natural and man-made environment, to conduct a preliminary analysis of the consequences of the information obtained during the study
		PC -2.2 Able to analyze environmental monitoring data, make preliminary conclusions about the state of the facility and the environment
		PC -2.3 Able to assess the environmental impact of the projected enterprise and structures, predict and assess negative consequences

3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF EP HE:

The course "Environmental control and monitoring of urban environment" refers to the part formed by the participants of the educational relations of the block B1.

As part of the EP HE, students also master other disciplines and / or practices that contribute to the achievement of the planned results of mastering the discipline "Environmental control and monitoring of urban environment".

Table 3.1. The list of the components of the educational program that contribute to the achievement of the planned results of mastering the discipline

Code	Name of the competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
PC -2	Able to analyze environmental monitoring data, make preliminary conclusions about the state of the facility and the environment	Environmental management Methods of environmental monitoring	

* - 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 "Environmental control and monitoring of urban environment" is 2 credit.

Table 4.1. Types of educational work by periods of mastering the EP HE for FULL-time education

Type of educational work		TOTAL, ac.h.	Semester(s)			
			1	2	3	4
Contactwork, ac.h.		15		15		
including:						
Lectures (L)		15		15		
Laboratorywork (LW)						
Practical/seminarclasses (SC)						
Independent work of students, ac.h.		43		43		
Control (exam / test with assessment), ac.h.		14		14		
Total labor intensity of the discipline		ac.h.	72	72		
		credit	2	2		

Table 4.2. Types of educational work by periods of mastering the EP HE for CORRESPONDENCE forms education*

Type of educational work	TOTAL, ac.h.	Semester(s)			
		1	2	3	4
Contactwork, ac.h.	4		4		
including:					
Lectures (L)	4		4		
Laboratorywork (LW)					
Practical/seminarclasses (SC)					
Independent work of students, ac.h.	64		64		
Control (exam / test with assessment), ac.h.	4		4		
Total labor intensity of the discipline	ac.h.	72		72	
	credit	2		2	

* - filled in in case of implementation of the program in correspondence forms education

5. CONTENT OF THE DISCIPLINE

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

Name of the discipline section	Content of the section (topics)	Type of educational work*
Topic 1. Theoretical and methodological foundations of industrial waste management. Monitoring programs in the city.	<i>Human influence on changes in the circulation of substances and energy flows in the environment. Natural resource potential of production. Agro-climatic resources. Biological resources. The current state and features of use. Resource cycles; their classification and features of functioning. The nature of the production cycle of raw materials. Biogeochemical cycles. The volume of production of polluting products and their distribution in the environment, their stability and their ability to decompose. Transformation of harmful substances. Environmental passport of an industrial enterprise. GOST standard 17.0.0.04-90 « Nature protection. Industrial enterprise ecological certificate. Fundamental</i>	(L,S)

Name of the discipline section	Content of the section (topics)	Type of educational work*
	<i>regulations». Assessment of environmental friendliness of production, consumption of raw materials, energy, natural resources. Emissions of pollutants perunit of production.</i>	
Topic 2. Study of the system of methods of observation and ground support of environmental monitoring	<i>Classification of environmental monitoring. Contact and non-contact control methods.</i>	(L,S)
Topic 3. Basic requirements for waste management activities	<p><i>Organization and implementation of state control and supervision of activities in the field of waste management. Environmental requirements for the placement of landfills for the storage of agricultural waste. Coordination with the general development plan of the suburban area. The prospects for the placement of polygons. The size of the sanitary protection zone. Normalization of anthropogenic load on landscapes and regulation of the structure of land acquisition. Conducting engineering and environmental surveys of the territory. Assessment of the possibility of using the territory. Environmental factors of the location of production facilities and enterprises.</i></p> <p><i>The Law of the Russian Federation "On Standardization". The scheme of operation of the landfill: organization, delivery, installation of cavaliers, excavation development, environmental control, unloading, sealing, laying of intermediate layers of insulation, closure and reclamation, environmental monitoring. Module "Technological processes and types of production in industry". Calculation of specific indicators of normative volumes of agricultural waste generation</i></p>	(L,S)
Topic 4. Mathematical modeling of dynamic processes in the field of waste management	<i>Simulation models in the field of waste disposal.</i>	(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

Classroom type	Classroom equipment	Specialized educational/laboratory equipment and materials for the discipline/module realization
Lecturehall	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical means of multimedia presentations.	
Laboratory	An auditorium for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.	
Seminars hall	An auditorium for conducting seminar-type classes, group and individual consultations, ongoing monitoring and interim certification, equipped with a set of specialized furniture and multimedia presentation equipment.	
Computer classroom	A computer classroom for conducting classes, group and individual consultations, ongoing monitoring and interim certification, equipped with personal computers (in the amount of ___pcs.), a blackboard (screen) and multimedia presentation technical means.	
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 EIOS.	

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

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

Mandatory literature:

1. Харламова М.Д. Твердые отходы: технологии утилизации, методы контроля, мониторинг [Текст] : Учебное пособие для академического бакалавриата / М.Д. Харламова, А.И. Курбатова; Под ред. М.Д. Харламовой. - 2-е изд., испр. и доп. - М. :Юрайт, 2018. - 311 с. : ил. - (Бакалавр. Академический курс. Модуль). - ISBN 978-5-534-07047-7 : 749.00. 30.69 - X 21 Библиотека РУДН

2. Хаустов А.П. Производственный экологический мониторинг [Текст/электронный ресурс] : Учебное пособие / А.П. Хаустов, М.М. Редина. - М. : Изд-во РУДН, 2008. - 502 с. : ил. - ISBN 978-5-209-02975-5 : 0.00. Библиотека РУДН

Additional literature:

1. Хаустов А.П. Экологический мониторинг : Учебник академического бакалавриата / А.П. Хаустов, М.М. Редина. - М. :Юрайт, 2018. - 489 с. - (Бакалавр. Академический курс). - ISBN 978-5-534-00596-7 : 1119.00. Библиотека РУДН

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.elsevierscience.ru/products/scopus/>

* - all teaching materials for independent work of students are placed in accordance with the current procedure on the discipline page in the TUIS!

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

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

Evaluation materials and a score-rating system* for assessing the level of competence formation (part of competencies) based on the results of mastering the discipline "Environmental control and monitoring of urban environment" 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)

Developers:

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