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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

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

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 regulations». Assessment of environmental friendliness of</i>	(L,S)

Name of the discipline section	Content of the section (topics)	Type of educational work*
	<i>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:

Ass. Professor of the
Department of
Environmental Safety and
Product Quality
Management for
Educational Activities

position, educational department


ПОДПИСЬ

signature

Kurbatova A.I.

name and surname.

HEAD OF Educational Department:

Director of the Department
of Environmental
Management

educational department



signature

Kucher D.E.

name and surname.

HEAD OF Higher Education Programme:

Director of the Department
of Environmental
Management

position, educational department



signature

Kucher D.E.

name and surname

Department _____
educational department to be specified

APPROVED
Department meeting protocol No _____,
Dated _____
day, month, year
Head of Educational Department

(name and surname)
signature

ASSESSMENT TOOLKIT

for the course

Environmental control and monitoring of urban environment

08.04.01 Construction, 05.04.06.Ecology and environmental Management

Environmental Engineering in Construction

master's

	<p>placement of landfills for the storage of agricultural waste. Coordination with the general development plan of the suburban area.</p>																								
	<p>Topic 2: 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. The Law of the Russian Federation "On Standardization".</p>																								
	<p>Topic 3: The scheme of operation of the landfill</p>																								

Course _____

course title

QUESTION CARD No

QUESTION 1

QUESTION 2

3 *

Developer _____ (name and surname)

signature

Head of Educational Department _____ (name and surname)

signature

day, month, year

Note * Practice case/task inclusion is subject to the teacher's discretion.

The set of exam question cards is complemented by the assessment criteria developed by the teacher and approved at the department meeting.

Assessment criteria:

(in compliance with the legal regulations in force)

Tentative list of assessment tools

№ / №	Assessment tool	Brief features	Assessment tool representation in the kit
<i>Class work</i>			
1	Survey/Quiz	A tool of control, organised as a special conversation between a teacher and students on topics related to the course under study, and designed to clarify the amount of students' knowledge in a particular section, topic, problem, etc.	Questions on the course topics /modules
2	Test	A system of standardised tasks that allows the teacher to automate the procedure for measuring the student's level of knowledge and skills	Tests bank
3.	Colloquium	A tool for monitoring the acquisition and mastering of educational material on a topic, section or sections of a discipline, organised as a training session in the form of an interview among the teacher and students.	Questions on the course topics /modules
4	Control work	A tool of control organised as a classroom lesson, at which students need to independently demonstrate the acquisition and mastering of the educational material of the course topic, section, or sections.	Questions on the course topics /modules
5	Lab work	The system of practice tasks aimed at the students' practical skills formation	Practice tasks bank
6.	Round table, discussion, polemic, dispute, debate, (class work)	Evaluation tools that allow the teacher to engage students in the process of discussing controversial issues, problems and assess their ability to argue their own point of view.	List of themes for round tables, discussions, polemics, disputes, debates.
7	Business game and/or role play	Joint activities of a student group under the teacher's control to solve educational and professionally oriented tasks through the simulation of a real-world problem; this activity allows the teacher to assess the students' ability to analyse and solve typical professional challenges.	Topic (problem), concept, roles and expected results for each game
8.	Essay	A tool that allows the teacher to assess the student's ability to express in writing the essence of the under study, to independently analyse this issue using the concepts and analytical tools of the relevant discipline, to draw conclusions that summarise his/her position on the issue under consideration.	Themes for essays
9.	Presentation	A tool for monitoring the students' ability to	Themes for

	(defence) of project/report/Library research paper/briefs *	present the work results to the audience.	projects/reports/ Library research paper/ briefs
10	Pass/Fail assessment	A tool for checking the quality of students' performance of laboratory work, acquisition and mastering of the practice training and seminar educational material, successful completion of the advanced field internship and pre-graduate internship and fulfillment of all training assignments in the course of these internships in accordance with the approved programme.	Tasks examples
11	Exam	The evaluation of the student's work during the semester (year, the entire period of study, etc.); it is designed to identify the level, soundness and systematic nature of theoretical and practical knowledge gained by the student, formation of independent work skills, development of creative thinking, ability to synthesise the acquired knowledge and apply it to solve practice tasks.	Examples of tasks/questions/exam question cards
12	Internship and research and development (R&D) report	A form of written work that allows the student to generalise his/her knowledge, skills and abilities acquired during the introductory and advanced field internships, scientific and industrial internships and R&D activities.	
13	Case	A problem-solving task in which the student is asked to comprehend the real work-related (occupational) situation necessary to solve the problem.	Assignments to solve the case
14	Multi-level tasks and assignments with varying difficulty	The tasks and assignments differ in terms of the following levels: a) reproductive level allows the teacher to evaluate and diagnose the students' knowledge of factual material (basic concepts, algorithms, facts) and the students' ability to correctly use special terms and concepts, recognize objects of study within a certain section of the discipline, b) reconstructive level allows the teacher to evaluate and diagnose the students' abilities to synthesise, analyse, generalise factual and theoretical material and formulate specific conclusions, establish cause-and-effect	Set of multi-level tasks and assignments with varying difficulty

		relationships, c) creative level allows to evaluate and diagnose students' skills to integrate knowledge of various fields, argue their own point of view.	
<i>Self- studies</i>			
1	Calculation and graphic work	A tool for checking students' skills in applying the acquired knowledge according to a predetermined methodology in task solving or fulfilling assignments for a module or discipline as a whole.	Set of tasks for calculation and graphic work
2	Coursework/project	A type of independent written work aimed at the creative development of general professional and specialised professional disciplines (modules) and the development of relevant professional competences	Course assignment themes
3	Project	The final "product" that results from planning and performance of educational and research tasks set; it allows the teacher to assess the students' ability to independently shape their knowledge in the course of solving practice tasks and problems, navigate in the information environment and the students' level of analytical, research skills, skills of practical and creative thinking; it can be implemented individually or by a group of students.	Themes for team-based or individual projects
4	Research essay (Library research paper)	The student's independent work in writing that summarises the results of the theoretical analysis of a certain scientific (educational and research) topic, where the author reveals the essence of the problem under study, considers different points of view, as well as argues his/her views on the material under consideration.	Themes for research essay (library research papers)
5	Reports, briefs	The product of the student's independent work, which is a public performance on the presentation of the results of solving a specific educational, practical, research or scientific topic.	Themes for reports, briefs
6	Essay and other creative assignments	A partially regulated assignment that has a non-standard solution and allows the teacher to diagnose students' skills in integrating knowledge from various fields and arguing their own point of view; it can be prepared individually or by a group of students.	Themes for team-based or individual creative assignments
7	Standard calculations	A tool to test skills in applying the acquired knowledge, according to a predetermined methodology, solving tasks or fulfilling assignments for a module or discipline as a whole.	Set of tasks for standard calculations

8	Homework	<p>The tasks and assignments differ in terms of the following levels:</p> <p>a) reproductive level allows the teacher to evaluate and diagnose the students' knowledge of factual material (basic concepts, algorithms, facts) and the students' ability to correctly use special terms and concepts, recognize objects of study within a certain section of the discipline,</p> <p>b) reconstructive level allows the teacher to evaluate and diagnose the students' abilities to synthesise, analyse, generalise factual and theoretical material and formulate specific conclusions, establish cause-and-effect relationships,</p> <p>c) creative level allows the teacher to evaluate and diagnose students' skills to integrate knowledge of various fields, argue their own point of view.</p>	Set of multi-level tasks and assignments with varying difficulty
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Template for an assignment on a business game and/or role play

Department _____

educational department to be specified

Business game and/or role play

for the course _____

course title

1 Theme (problem)

.....
.....

2 Game conception

.....
.....

3 Roles:

-;
-;

4 Expected outcomes.....

.....

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

Template for an assignment on a case study

Department _____

educational department to be specified

Case study

for the course _____

course title

Assignment (s):

-;
-;
-;
-

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

Template for questions for colloquiums, interviews

Department _____

educational department to be specified

Questions for colloquiums, interviews

for the course _____

course title

Module
1
2
...
n

Module
1
2
...
n

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

Department _____

educational department to be specified

Set of assignments for control work

for the course _____

course title

Theme

Variant 1

Task 1

Task n

.....
Theme 2

Task 1

Task n

Theme

Variant 1

Task 1

Task n

Variant 2

Task 1

Task n

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

Department _____

educational department to be specified

List of themes for round tables, discussions, polemics, disputes, debates

For the course _____

course title

- 1
- 2.....
-
- n

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

Template for a portfolio

Department _____

educational department to be specified

Portfolio¹

for the course _____

course title

1 Portfolio title

2 Portfolio structure (common and variable parts):

2.1

2.2

... ..

n

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

¹This assessment tool has to be completed with the guidance on its development and use

Template for team-based or individual creative assignments/projects

Department _____

educational department to be specified

Themes for team-based or individual creative assignments/projects**

for the course _____

course title

Team-based creative assignments/projects:

- 1
- 2
-
- n

Individual creative assignments/projects:

- 1
- 2
-
- n

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

Template for multi-level tasks and assignments with varying difficulty

Department _____

educational department to be specified

Multi-level tasks and assignments with varying difficulty

for the course _____

course title

1 Reproductive level tasks

Task (assignment) 1

Task (assignment) 2

Task (assignment) n

2 Reconstructive level tasks

Task (assignment) 1

Task (assignment) 2

Task (assignment) n

3 Creative level tasks

Task (assignment) 1

Task (assignment) 2

Task (assignment) n

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

Template for a set of tasks for calculation and graphic work, simulator training

Department _____

educational department to be specified

Set of tasks for calculation and graphic work, simulator training

For the course _____

course title

- Task (assignment) 1
- Task (assignment) 2
- Task (assignment) 3
- Task (assignment) 4
- Task (assignment) 5
- Task (assignment) n

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

Template for themes for essays (reviews, reports, briefs)

Department _____

educational department to be specified

Themes for essays
(research essay/library research papers*, reports, briefs)

for the course _____

course title

- 1
- 2
- 3
- ...
- n

Assessment criteria:

(in compliance with the legal regulations in force)

Developer _____ (name and surname)

signature

*Requirements for library research papers can be found at

<https://custom-writing.org/blog/library-research-paper>

<https://www.cambridge.org/core/books/abs/psychologists-companion/steps-in-writing-the-library-research-paper/D4AFF7400D158C124F58EC71E2E7B004>