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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**

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

**COURSE SYLLABUS**

**URBAN DEVELOPMENT  
AND ENVIRONMENTAL ENGINEERING SURVEYS**

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course title

**Recommended by the Didactic Council for the Education Field of:**

08.04.01 Construction  
05.04.06 Ecology and environmental Management

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field of studies / speciality code and title

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

**Environmental Engineering in Construction**

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higher education programme profile/specialisation title

## 1. OBJECTIVE OF THE DISCIPLINE

The purpose of the discipline is to form the readiness of students to use theoretical knowledge and practical skills in the field of engineering and environmental surveys and drawing up programs for sustainable environmentally oriented urban development for the implementation of professional scientifically based design, technological and research activities in the field of ecology and nature management.

Objectives of the discipline: mastering the knowledge, skills and skills of diagnostics, environmental audit and expertise of designed, reconstructed and operated facilities and their technogenic impacts on the environment in order to develop a set of measures to reduce the impact on the environment and ensure sustainable development of urbanized areas.

## 2. REQUIREMENTS FOR THE RESULTS OF DISCIPLINE MASTERING

Mastering the discipline "Urban development and environmental engineering surveys" 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	Competence	Indicators of competence achievement (within the framework of this discipline)
GPC 3э	Able to apply environmental research methods to solve research and applied tasks of professional activity	GPC-3э.1 Able to identify and has the skills to solve problems, tasks of scientific research in the field of geography of cities, environmental problems of cities
		GPC-3э.2 Possesses modern methods of assessing geoecological information for solving theoretical and practical problems of nature management
		GPC-3э.3 Has the skills of forecasting meteorotropic reactions, assessing the climatic potential of regions, assessing the objectivity of climate scenarios of climate change
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
PC 3	Capable of performing and organizing scientific research of industrial and civil construction facilities, including in the field of environmental management	PC-3.1 Able to study the natural, man-made, socio-economic, demographic and biomedical situation, to search for cultural heritage objects in the study area, to explore industrial and civil construction facilities
		PC-3.2 Has the skills to carry out studies of environmental objects, including industrial and civil construction, on chemical, microbiological, parasitological, toxicological indicators

Code	Competence	Indicators of competence achievement (within the framework of this discipline)
		PC-3.3 Able to collect and analyze information about the natural and man-made environment, physical, geographical and climatic conditions, including in industrial and civil construction, based on materials from previous years

### 3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF THE EDUCATIONAL PROGRAM OF HIGHER EDUCATION

The course "Urban development and environmental engineering surveys" 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 "Urban development and environmental engineering surveys".

*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*
GPC 3э	Able to apply environmental research methods to solve research and applied tasks of professional activity	Urban water resources management and adaptation to climate change  Project management	Pre-graduate practice
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	Urban water resources management and adaptation to climate change  Environmental control and monitoring of the urban environment	Production practice Pre-graduate practice
PC 3	Capable of performing and organizing scientific research of industrial and civil construction facilities, including in the field of environmental management	Fundamentals of scientific research  Project management	Pre-graduate practice

\* - filled in in accordance with the matrix of competence

### 4. SCOPE OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

The total labor intensity of the discipline "Urban development and environmental engineering surveys" is 3 credit.

Table 4.1. Types of educational work according to the periods of mastering the educational program of higher education for CORRESPONDENCE education FULL-time education

Type of educational work	TOTAL, ac.h.	Semester(s)			
		1	2	3	4
Contactwork, ac.h.	108			108	
including:					
Lectures (L)	17			17	
Laboratorywork (LW)					
Practical/seminarclasses (SC)	17			17	
Independent work of students, ac.h.	49			49	
Control (exam / test with assessment), ac.h.	25			25	
<b>Total labor intensity of the discipline</b>	ac.h.	<b>108</b>		<b>108</b>	
	credit	<b>3</b>		<b>3</b>	

Таблица 4.3. Types of educational work according to the periods of mastering the educational program of higher education for CORRESPONDENCE education

Type of educational work	TOTAL, ac.h.	Semester(s)			
		1	2	3	4
Контактная работа, ак.ч.	108			108	
including:					
Lectures (L)	4			4	
Laboratorywork (LW)					
Practical/seminarclasses (SC)	4			4	
Independent work of students, ac.h.	96			96	
Control (exam / test with assessment), ac.h.	4			4	
<b>Total labor intensity of the discipline</b>	ac.h.	<b>108</b>		<b>108</b>	
	credit	<b>3</b>		<b>3</b>	

## 5. CONTENT OF THE DISCIPLINE

### The content of the discipline sections

Name of the discipline section	Content of the section (topics)
<b>Topic 1.</b> Regulatory and technical documentation for engineering and environmental surveys and urban agglomeration development	Regulatory, logistical and informational support of engineering and environmental surveys and environmental impact assessment. Provisions of the Town-Planning Code of the Russian Federation. Requirements and provisions of the Code of Rules. Engineering surveys for construction. Types of engineering surveys, general requirements and rules for their implementation
<b>Topic 2.</b> Types of research, obtaining, systematization and processing of primary environmental and geocological information	Methods and methods of collecting and processing information of theoretical and empirical levels obtained on the basis of work with stock materials and documents, the results of field and laboratory studies, and data on the state of components of the natural environment, the presence of territories with special use regimes, cultural heritage sites, possible sources of pollution of atmospheric air, soils, soils, surface and groundwater, bottom sediments and surface water bodies, socio-economic conditions.

Name of the discipline section	Content of the section (topics)
	Decoding of aerospace materials using various types of surveys (black-and-white, multi-zone, radar, thermal, etc.). Reconnaissance survey. Route observations describing the components of the natural environment and landscapes in general, the state of terrestrial and aquatic ecosystems, possible sources and visual signs of pollution. Research and assessment of pollution of atmospheric air, soils and soils, surface and groundwater. Research and assessment of bottom sediment pollution in surface water bodies. Research and assessment of the radiation situation. Research and evaluation of physical impacts. Sanitary and epidemiological studies. Gas-geochemical studies of soils. Studies of socio-economic conditions. Ecological and landscape studies. Study of vegetation. The study of the animal world. The study of dangerous natural and natural-anthropogenic processes of an ecological nature. Ecological testing of individual components of the environment (atmospheric air, soils, soils, surface and groundwater, bottom sediments). Laboratory chemical and analytical studies of samples of atmospheric air, soils, soils, underground and surface waters, bottom sediments. Desk processing of materials. Preparation of a technical report
<b>Topic 3.</b> Types of work: stages and content of engineering and environmental surveys taking into account the trajectory and route of development of the city	Planning, organizing and conducting engineering and environmental surveys and environmental impact assessment. Pre-investment, urban planning and investment levels and types of work on them carried out during engineering and environmental surveys
<b>Topic 4.</b> Engineering and environmental surveys on the main industrial objects of the city	Engineering and environmental surveys and environmental impact assessment to substantiate project documentation by industry. Preparation and protection of the report

### Sections of disciplines and types of classes

*For full-time education*

№	Name of the discipline section	L	SC	Independent work of students	Total ac.h.
1	Regulatory and technical documentation for engineering and environmental surveys and urban agglomeration development	4	4	12	20
2	Types of research, obtaining, systematization and processing of primary environmental and geoecological information	5	5	13	23
3	Types of work: stages and content of engineering and environmental surveys taking into account the trajectory and route of development of the city	4	4	12	20
4	Engineering and environmental surveys on the main industrial objects of the city	4	4	12	20
Total ac.h.		17	17	49	83

*For correspondence education*

<b>№</b>	<b>Name of the discipline section</b>	<b>L</b>	<b>SC</b>	<b>Independent work of students</b>	<b>Total ac.h.</b>
1	Regulatory and technical documentation for engineering and environmental surveys and urban agglomeration development	1	1	24	26
2	Types of research, obtaining, systematization and processing of primary environmental and geoecological information	1	1	24	26
3	Types of work: stages and content of engineering and environmental surveys taking into account the trajectory and route of development of the city	1	1	24	26
4	Engineering and environmental surveys on the main industrial objects of the city	1	1	24	26
Total ac.h.		4	4	96	104

**Independent work**

*For full-time education*

<b>Discipline section No.</b>	<b>Name of the type of independent work</b>	<b>Labor intensity (hour)</b>
1	Study of lecture material	4
	Drawing up a subordinate structure of documents containing requirements for conducting engineering and environmental surveys and assessing the environmentally safe development of the urban area	4
	Preparation of a presentation on the topic "Basic and special types of engineering surveys. General requirements for engineering and environmental surveys"	4
2	Study of lecture material	4
	Preparation of technical specifications for the implementation of engineering and environmental surveys, taking into account the trajectory and route of the city's development	4
	Preparation of programs implementation of engineering and environmental surveys taking into account the trajectory and route of the city development	5
3	Study of lecture material	2
	Preparatory stage of engineering and environmental surveys. Planning of route observations. Placement of geochemical sampling points	2
	Preparation of an environmental audit program and examination of project documentation	2
	Development of estimates for engineering and environmental surveys for construction, determination of the estimated cost of engineering and environmental surveys, assessment of the environmental impacts of the city of objects	3
	Preparation of a report on the conduct of engineering and environmental surveys taking into account the development of the city	3
4	Study of lecture material	4

<b>Discipline section No.</b>	<b>Name of the type of independent work</b>	<b>Labor intensity (hour)</b>
	Preparation of the presentation of an individual project assignment	8

*For correspondence education*

<b>Discipline section No.</b>	<b>Name of the type of independent work</b>	<b>Labor intensity (hour)</b>
1	Study of lecture material	8
	Drawing up a subordinate structure of documents containing requirements for conducting engineering and environmental surveys and assessing the environmentally safe development of the urban area	8
	Preparation of a presentation on the topic "Basic and special types of engineering surveys. General requirements for engineering and environmental surveys"	8
2	Study of lecture material	8
	Preparation of technical specifications for the implementation of engineering and environmental surveys, taking into account the trajectory and route of the city's development	8
	Preparation of programs implementation of engineering and environmental surveys taking into account the trajectory and route of the city development	8
3	Study of lecture material	4
	Preparatory stage of engineering and environmental surveys. Planning of route observations. Placement of geochemical sampling points	5
	Preparation of an environmental audit program and examination of project documentation	5
	Development of estimates for engineering and environmental surveys for construction, determination of the estimated cost of engineering and environmental surveys, assessment of the environmental impacts of the city of objects	5
	Preparation of a report on the conduct of engineering and environmental surveys taking into account the development of the city	5
4	Study of lecture material	12
	Preparation of the presentation of an individual project assignment	12

## **6. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE**

*Table 6.1. Material and technical support of discipline*

<b>Classroom type</b>	<b>Classroom equipment</b>
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

Classroom type	Classroom equipment
	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, 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.

## 7. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

a) software: office suite of applications Microsoft Office, Microsoft Word, Microsoft PowerPoint;

b) software for building GIS of any level of ArcGIS, SAS.Planet;

c) Yandex, Google search engines;

d) information reference systems:

- <http://elibrary.ru/> – scientific electronic library E-library;

- <http://biblioclub.ru/> – Electronic library system "University Library online";

- <https://e.lanbook.com/> – Electronic library system of the publishing house "Lan";

- <https://biblio-online.ru/> – Electronic library system of the publishing house "Yurayt";

- <https://rucont.ru/> – National Digital Resource Rukont – intersectoral electronic library.

### *Main literature:*

1. Колесников Е.Ю. Оценка воздействия на окружающую среду. Экспертиза безопасности: учебник и практикум для вузов / Е. Ю. Колесников, Т. М. Колесникова. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 471 с. – (Высшее образование). – ISBN 978-5-534-15905-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <https://urait.ru/bcode/510250>.

2. Ларионов Н.М. Промышленная экология: учебник и практикум для вузов / Н.М. Ларионов, А.С. Рябышенков. – 3-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 441 с. – (Высшее образование). – ISBN 978-5-534-15302-6. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <https://urait.ru/bcode/510668>.

3. Латышенко К.П. Экологический мониторинг: учебник и практикум для вузов / К.П. Латышенко. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 424 с. – (Высшее образование). – ISBN 978-5-534-13721-7. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <https://urait.ru/bcode/511478>.

4. Мананков А.В. Урбоэкология и техносфера: учебник и практикум для вузов / А.В. Мананков. – Москва: Издательство Юрайт, 2023. – 494 с. – (Высшее образование). – ISBN 978-5-534-06909-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <https://urait.ru/bcode/515032>.

### *Additional literature:*

1. Мананков А.В. Геоэкология. Методы оценки загрязнения окружающей среды: учебник и практикум для вузов / А.В. Мананков. – 2-е изд., испр. и доп. – Москва:

Издательство Юрайт, 2023. – 186 с. – (Высшее образование). – ISBN 978-5-534-07885-5. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <https://urait.ru/bcode/512910>.

2. Родионов А.И. Технологические процессы экологической безопасности. Гидросфера: учебник для вузов / А.И. Родионов, В.Н. Клушин, В.Г. Систер. – 5-е изд., испр. и доп. – Москва: Издательство Юрайт, 2023. – 283 с. – (Высшее образование). – ISBN 978-5-534-05700-3. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <https://urait.ru/bcode/515747>.

3. Родионов А.И. Технологические процессы экологической безопасности. Атмосфера: учебник для вузов / А.И. Родионов, В.Н. Клушин, В.Г. Систер. – 5-е изд., испр. и доп. – Москва: Издательство Юрайт, 2023. – 201 с. – (Высшее образование). – ISBN 978-5-534-10700-5. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <https://urait.ru/bcode/515191>.

*Resources of the Internet information and telecommunication network:*

1. EBS RUDN and third-party EBS, to which university students have access on the basis of concluded contracts:

- Electronic library system of RUDN – EBS RUDN <http://lib.rudn.ru/MegaPro/Web>
- EBS "University Library online" <http://www.biblioclub.ru>
- ABS Yurayt <http://www.biblio-online.ru>
- EBS "Student Consultant" [www.studentlibrary.ru](http://www.studentlibrary.ru)
- EBS "Doe" <http://e.lanbook.com/>
- EBS "Trinity Bridge"

2. *Databases and search engines:*

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

search engine Yandex <https://www.yandex.ru/>

- Google search engine <https://www.google.ru/>

- bibliographic database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

## **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 "Urban development and environmental engineering surveys" 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:**

Docent of the Department of  
Environmental Management



Latushkina E.N.

Professor of the Department of  
Environmental Management



Stanis E.V.

**HEAD OF Educational Department:**

Director of the Department  
of Environmental  
Management



Kucher D.E.

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educational department

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signature

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name and surname.

**HEAD OF HIGHER  
EDUCATION PROGRAM:**

Director of the Department of  
Environmental Management



Kucher D.E.

# **ASSESSMENT TOOLKIT**

**for the course**

Urban development and environmental engineering surveys

08.04.01 Construction, 05.04.06 Ecology and environmental Management

Environmental Engineering in Construction

master's

### PASSPORT OF THE APPRAISAL FUND

The code of the controlled competence or its part	Discipline section	Assessment toolkit						Test-off	Sections, score
		Classroom work			Independent work				
		Attendance and active work in the classroom	Test	Survey	Doing homework	Report	Individual project assignment		
GPC 3ᅁ PC 2 PC 3	Regulatory and technical documentation for engineering and environmental surveys and urban agglomeration development	3	5	5	3	10	21	16	11
GPC 3ᅁ PC 2 PC 3	Types of research, obtaining, systematization and processing of primary environmental and geocological information	6			6				17
GPC 3ᅁ PC 2 PC 3	Types of work: stages and content of engineering and environmental surveys taking into account the trajectory and route of development of the city	7	5	5	3				15
GPC 3ᅁ PC 2 PC 3	Engineering and environmental surveys on the main industrial objects of the city	2			3				10
Total:		18	10	10	15	10	21	16	-
100									

**Questions for the test in the discipline "Urban development and engineering and environmental surveys". Controlled by GPK 3, PK 2, PK 3**

1. Regulatory and legal framework of engineering and environmental surveys, design of urban areas
2. Terms of reference for conducting engineering and environmental surveys in urban areas
3. Drawing up a program of engineering and environmental surveys, development of urban areas
4. Composition of engineering and environmental surveys
5. Collection, analysis of published, stock materials
6. Composition of engineering and environmental surveys. Decryption of remote sensing data
7. Composition of engineering and environmental surveys. Route observations
8. Composition of engineering and environmental surveys. Testing of environmental components
9. Composition of engineering and environmental surveys. Study of physical effects. Electromagnetic field
10. Composition of engineering and environmental surveys. Study of physical effects. Noise and vibration
11. Composition of engineering and environmental surveys. Study of physical effects. Radiological studies
12. Composition of engineering and environmental surveys. Gas-geochemical studies
13. Composition of engineering-ecological, geobotanical, zoological studies
14. Composition of engineering and environmental surveys. Socio-economic research
15. Composition of engineering and environmental surveys. Sanitary and epidemiological studies of territories
16. Composition of engineering and environmental surveys. Archaeological research
17. Stages of engineering and environmental surveys in urban conditions
18. Requirements and rules for the preparation of estimates of engineering and environmental surveys, documents on the assessment of environmental impacts of the city
19. Cartographic support of engineering and environmental surveys, development of urban agglomerations
20. Technical report on the conduct of engineering and environmental surveys for urban development objects
21. State environmental expertise of materials of engineering and environmental surveys, documents on the assessment of the impacts of construction projects on the environment
22. Laboratory work as part of engineering and environmental surveys in urban conditions

**Criteria for evaluating answers to questions. The answer to each question is estimated from 0 to 16 points:**

Response evaluation criteria	Compliance of the answer with the criterion, points		
	does not match	partially corresponds to	fully compliant
The answer is correct	0	2	3
The student gives an answer without leading questions from the examiner	0	1	2
The student practically does not use the prepared draft	0	1	2
The answer shows the teacher's confident command of the terminological and methodological apparatus of the discipline	0	1	3
The answer has a clear logical structure	0	1	2

Response evaluation criteria	Compliance of the answer with the criterion, points		
	does not match	partially corresponds to	fully compliant
The answer shows the student's understanding of the connections between the subject of the question and other sections of the discipline and/or other disciplines	0	2	4

**Test tasks. Controlled by GPK 3, PK 2, PK 3**

1. List the main types of engineering surveys:
  - a) engineering-geodetic surveys, geotechnical studies, surveys of the soil condition of the foundations of buildings and structures, their structures
  - b) engineering-geodetic surveys, engineering-geological surveys, engineering-hydrometeorological surveys
  - c) engineering-hydrometeorological surveys, engineering-environmental surveys, geotechnical studies
  - d) engineering and geodetic surveys, engineering and geological surveys, engineering and environmental surveys, local monitoring of environmental components
2. Special types of engineering surveys do not include:
  - a) geotechnical research
  - b) surveys of the soil condition of the foundations of buildings and structures, their structures
  - c) search and exploration of groundwater for water supply purposes
  - d) engineering and geodetic surveys
3. List the types of work included in the engineering and environmental surveys (at least 10 options)
4. The regulatory and legal basis for the performance of engineering surveys is not:
  - a) The Urban Planning Code of the Russian Federation
  - b) The Land Code of the Russian Federation
  - c) the Federal Law "Technical Regulations on the safety of Buildings and Structures"
  - d) Regulations on the performance of engineering surveys for the preparation of project documentation, construction, reconstruction, capital repairs of capital construction facilities
  - e) A set of rules. Engineering surveys for construction. Basic provisions
5. Who can conduct engineering surveys? AI can be performed by individuals and legal entities that comply with the requirements of the legislation of the Russian Federation imposed on persons performing engineering surveys, including the developer himself, i.e. have the admission of a self-regulatory organization based on the membership of persons performing AI
6. List the stages of engineering surveys:
  - a) preparatory, engineering and environmental surveys, completion of work
  - b) initial, carrying out measurements and sampling, processing of materials
  - c) preparatory, field research, desk processing of information
  - d) initial, collection of information, preparation of accounting documentation
7. Environmental quality standards include:
  - a) MPC, UEC, PNOOLR
  - b) MPC, ODC, ODU
  - c) IZV, ISA, PDS
  - d) PDV, PDS, PNOOLR
8. The standards of permissible withdrawal do not apply:
  - a) water intake
  - b) estimated cutting area

- c) waste water discharge
- d) limits on the use of wildlife

10. The production and resource direction of environmental regulation includes:

- a) ISA, IZV, PNOOLR;
- b) PDV, PDS, IZV;
- c) PDV, PDS, SHOES;
- d) PDV, PDS, safety declaration

11. What is the name of the effect on the human body of harmful chemicals that cause an allergic reaction? a) toxic b) sensitizing c) carcinogenic d) teratogenic

12. List the main ways of penetration of harmful substances into the body. Briefly describe each one.

- Oral route (ingestion through the gastrointestinal tract with food and water)
- Inhalation route (intake through respiratory organs) The cutaneous pathway (admission through the skin)

13. How many hazard classes of harmful substances are there? A) 5 B) 3 C) 4 D)

14. What does the concept of synergy in the combinatorial action of harmful substances mean?

- a) summation of harmful effects
- b) over-summation of harmful effects
- c) reduction of harmful effects
- d) independent action of substances

15. Define the following concepts: The degree of toxicity is the absolute amount or dose that causes a certain biological effect, certain pathological changes Lethal dose is the dose that causes the death of the body Active dose is the dose that causes functional changes (intoxication of the body) The threshold dose is the smallest amount of a substance that causes, with a single exposure, such changes in the body that are detected by special biochemical or physiological tests in the absence of external signs of poisoning Inactive dose – the maximum amount of a substance that does not lead to any changes in the body Toxic non-lethal dose (ED) – causes visible manifestations without a fatal outcome Toxic lethal dose (LD) or concentration (LC) – causes poisoning, ending in the death of the body

16. Which substances belong to the second hazard class?

- a) non-dangerous b) highly dangerous c) moderately dangerous d) low-risk

17. The ratio of the threshold concentration for a single exposure to the threshold concentration for chronic exposure is called:

- a) the zone of chronic action
- b) single island action zone
- c) cumulation coefficient
- d) toxic non-lethal dose

18. The criterion for the quality of environmental components in the sanitary and hygienic direction of environmental regulation?

- a) MPC, UEC, IZV b) IZV, PNOOLR, ISA c) ISA, IZV, Zc d) PDV, PDS, PNOOLR

19. Does the preparatory stage of engineering and environmental surveys include?

- a) pre-network decryption
- b) geoecological testing
- c) instrumental analytical studies
- d) development of thematic maps

20. What engineering surveys are carried out to select the types of foundations?

- a) engineering and environmental surveys, b) engineering and geodetic surveys, c) engineering and geological surveys, d) exploration of ground construction materials.

### **Evaluation criteria:**

Each question contains one correct answer.

Correct answers are estimated at 0.5 points.

Incorrect answers are rated at 0 points.  
The maximum score for the test is 10 points.

**Topics of abstracts. Controlled by GPK 3а, PK 2, PK 3**

1. Specifics of carrying out engineering and environmental surveys of transport infrastructure
2. Specifics of conducting engineering and environmental surveys of the oil and gas complex
3. Specifics of carrying out engineering and environmental surveys for water intakes of household and drinking water supply
4. Specifics of conducting engineering and environmental surveys of civil construction
5. Gas-geochemical research as part of the IEI
6. Determination of the radon hazard of the territory, devices, normalized indicators
7. Measurement of the gamma background within the study area during the IEI
8. Thematic maps compiled during the implementation of the IEI
9. Ecological framework of the territory
10. Geoecological testing of soils, bottom sediments, selection methods, regulatory documents
11. Vibration. Means of measurement and control in the workplace. Technical requirements
12. Preparation of the soil passport
13. Soil sampling, soil geochemical studies
14. Sampling of bottom sediment, regulatory framework
15. Air sampling, regulatory framework
16. Sinking of mine workings as part of the IEI
17. Devices and devices for sampling, primary processing and storage of natural water samples. General technical requirements.
18. Requirements for the water quality of non-centralized water supply. Sanitary protection of sources
19. Instrumentation for engineering and environmental surveys
20. The problem of conducting IEI in hard-to-reach areas
21. Conducting an IEI examination

**Evaluation criteria. The abstract is estimated from 0 to 10 points:**

Response evaluation criteria	Compliance of the answer with the criterion, points		
	does not match	partially corresponds to	fully compliant
The abstract was completed on time	0	-	0,5
The abstract is logically built, clearly structured, the volume corresponds to the required	0	-	0,5
The abstract is designed in accordance with the requirements	0	-	0,5
The student has correctly drawn up borrowings	0	-	0,5
The abstract contains up-to-date information	0	0,5	1
The student presents objective verified scientific sources of information	0	0,5	1
The student presents relatively deep judgments and conclusions	0	0,5	1
The abstract reflects well understands the ideas expressed in the sources	0	0,5	1

Response evaluation criteria	Compliance of the answer with the criterion, points		
	does not match	partially corresponds to	fully compliant
The student compares data from several sources, identifies connections between them, compares, generalizes, classifies	0	0,5	1
The student presents the information briefly and informatively	0	0,5	1
The student uses his own formulations to present the information	0	0,5	1
The student's formulations do not distort the meanings stated in the sources	0	0,5	1

### Questions and tasks for conducting oral surveys

1. The purpose of performing engineering surveys for the preparation of project documentation, construction, reconstruction of capital construction facilities
2. What is the basis for performing engineering surveys, who determines the scope of the necessary surveys?
3. List the main types of engineering surveys
4. List the special types of engineering surveys
5. What is included in the engineering and environmental surveys?
6. What should include a Route geocological survey of built-up areas?
7. Why are Soil studies performed?
8. Why should testing and assessment of contamination of surface and groundwater be carried out during engineering and environmental surveys?
9. What should radiation and environmental studies include?
10. What should Stationary environmental observations include?
11. In what cases are stationary environmental observations carried out?
12. What should include a route survey of the site and the surrounding area?
13. Classification and forms of environmental pollution (pollutants)
14. Structure and principles of environmental regulation
15. Basic concepts and methods of establishing maximum permissible concentrations
16. Nitrogen oxides as a source of atmospheric air pollution (sources of atmospheric air intake, effects on the human body, maximum permissible maximum single concentration in atmospheric air)
17. Suspended substances (concept, composition, sources of entry into the atmospheric air)
18. Sulfur dioxide (sources of entry into the atmospheric air, effects on the human body, maximum permissible maximum single concentration in the atmospheric air)
19. Carbon monoxide (sources of entry into the atmospheric air, effects on the human body, maximum permissible maximum single concentration in the atmospheric air)
20. Polynuclear aromatic hydrocarbons (concept, sources of entry into the atmospheric air, effects on the human body)
21. Types and procedure for determining the maximum permissible concentrations of pollutants in the air of the working area
22. Types and procedure for determining the maximum permissible concentrations of pollutants in the air of settlements
23. Limiting signs of harmfulness established when rationing the maximum permissible concentrations in the air of settlements
24. Categories of water use according to SanPiN 2.1.5.980-00
25. List of normalized indicators in wastewater by epidemiological indicator
26. Bacteria of the E. coli group (characteristic of the group, sanitary and indicative value)

27. Which water bodies are not allowed to discharge wastewater?
28. Limiting signs of harmfulness established when rationing the maximum permissible concentrations in water for household and drinking purposes
29. Determination of the smell of natural waters (causes of occurrence, assessment of the nature of the smell, the intensity of the smell)
30. Transparency of natural waters (concept, method of determination)
31. pH (concept, scale of values, MPC in drinking water)
32. BOD, COD (concept, method of determination, MPC in water for household and drinking purposes)
33. Water objects of fishery purpose (concept, categories)
34. Limiting signs of harmfulness established when rationing maximum permissible concentrations in fishery water
35. Zones of sanitary protection of sources of household and drinking purposes (definition, examples of the regime of sanitary protection zones)
36. Epidemiological indicators of drinking water quality standards
37. General exchange indicators of drinking water quality standards
38. Limiting signs of harmfulness established when rationing the maximum permissible concentrations in drinking water
39. Mineralization and hardness of drinking water (concept, differences in definition, impact on human health)
40. The process of mineralization of organic matter (sanitary indicative value)
41. Ways to improve the quality of drinking water
42. List of organoleptic indicators of drinking water quality
43. Determination of the taste of drinking water (causes, assessment of the nature of the taste, the intensity of the taste)
44. Determination of the color of drinking water (concept, method of determination)
45. Determination of turbidity of drinking water (concept, method of determination)
46. List of radiation indicators of drinking water quality
47. Definitions of "soil profile", "soil horizon" and "soil cover"
48. Organogenic type of soil horizon (examples, general characteristics)
49. Eluvial and illuvial type of soil horizon (examples, general characteristics)
50. Humus of soil cover (concept, composition)
51. List of high-risk zones in the normalization of soil quality of settlements
52. List of sanitary indicators normalized when assessing soil quality
53. Examples of anthroponotic and zooanthroponotic infections transmitted through contaminated soil
54. The concept of persistence
55. Limiting signs of harmfulness that are suspended during the normalization of soil quality
56. Activity of radionuclides (concept, units of measurement)
57. Alpha decay (general characteristic, Soddy displacement rule for alpha decay, biological effect)
58. Beta (minus) decay (general characteristic, Soddy displacement rule for beta (minus) decay, biological effect)
59. General characteristics of gamma and X-ray radiation
60. Types of ionizing radiation by penetrating power
61. Types of ionizing radiation by linear energy transfer
62. Radioactive families of natural radioisotopes (general rule for determining the mass number)
63. Exposure dose of ionizing radiation (concept, units of measurement)
64. Absorbed dose of ionizing radiation (concept, units of measurement)
65. Equivalent dose of ionizing radiation (concept, units of measurement)
66. Dose rate (concept, unit of measurement)
67. Exposure dose rate of ionizing radiation (concept, units of measurement)

68. Power of the absorbed dose of ionizing radiation (concept, units of measurement)
69. Power of the equivalent dose of ionizing radiation (concept, units of measurement)
70. The law of radioactive decay
71. What is the difference between the concepts of isotope, isomer, nuclide?
72. Classification of ionizing radiation sources
73. Types of natural sources of ionizing radiation
74. Types of cosmic radiation as a source of ionizing effects
75. Natural radioisotopes of uranium
76. Natural radioisotopes of thorium
77. Natural radioisotopes of actinium
78. Natural radon radioisotopes
79. Natural radioisotopes of polonium
80. Natural radioisotopes of lead
81. General characteristics of radioactivity of rocks
82. General characteristics of soil radioactivity
83. General characteristics of radioactivity of natural waters
84. General characteristics of atmospheric air radioactivity

**Evaluation criteria during the survey. From 0 to 10 points:**

Response evaluation criteria	Compliance of the answer with the criterion, points		
	does not match	partially corresponds to	fully compliant
The answer is correct (contains information reflected in the sources from the list of main and recommended literature, lectures, reliable sources)	0	1	2
The student gives an answer without leading questions from the examiner	0	1	2
The answer shows the teacher's confident command of the terminological and methodological apparatus of the discipline	0	1	2
The answer has a clear logical structure	0	1	2
The answer shows the student's understanding of the connections between the subject of the question and other sections of the discipline	0	1	2

**An individual project task involves the preparation and protection of a project developed by a student: engineering and environmental surveys. Anyone can be selected as an object of influence, at the request of the student.**

**Evaluation criteria: From 0 to 21 points:**

Response evaluation criteria	Compliance of the answer with the criterion, points		
	does not match	частично соответствует	does not match
The work includes all the elements specified in the terms of reference	0	-	1
The work is designed in accordance with the requirements	0	0,5	1
The work is logically structured, and it has analytical data	0	-	1

Response evaluation criteria	Compliance of the answer with the criterion, points		
	does not match	частично соответствует	does not match
The work contains an indication of the use of previously obtained analytical data	0	1	2
References to sources are correct	0	0,5	1
The project was completed on time	0	0,5	1
The project contains up-to-date information	0	1	2
The student presented objective verified scientific sources of information	0	1	2
The student presented relatively deep judgments and conclusions	0	1	2
The student compares data from several sources, identifies connections between them, compares, generalizes, classifies	0	1	2
The student presented the information briefly and informatively	0	1	2
The student uses his own formulations to present information	0	1	2
The wording does not distort the meaning stated in the sources	0	0,5	2

### Homework assignments

1. Drawing up a subordinate structure of documents containing requirements for conducting engineering and environmental surveys and EIA
2. Preparation of a presentation on the topic "Basic and special types of engineering surveys. General requirements for engineering and environmental surveys"
3. Preparation of technical specifications for the implementation of engineering and environmental surveys, EIA
4. Preparation of a program for the implementation of engineering and environmental surveys, EIA
5. Development of estimates for engineering and environmental surveys for construction, EIA based on collections of base prices, determination of the estimated cost of IEI, EIA for specific objects

### Evaluation criteria: From 0 to 3 points:

Criteria for evaluating the completion of homework	Compliance of the answer with the criterion, points		
	does not match	does not match	does not match
The task shows the teacher's confident knowledge of the terminological and methodological apparatus of the discipline	0	0,5	1
The completed task has a clear logical structure	0	0,5	1
The answer shows the student's understanding of the connections between the subject of the question and other sections of the discipline and/or other disciplines	0	0,5	1

## **METHODOLOGICAL RECOMMENDATIONS FOR THE DEVELOPMENT OF THE DISCIPLINE**

According to the general requirements for intermediate and final attestation, formulated in Article 59 of Federal Law No. 273-FZ of December 29, 2012 "On Education in the Russian Federation", intermediate and final attestation are forms of assessment of the degree and level of development of the educational program by students.

Intermediate and final certification are conducted on the basis of the principles of objectivity and independence of the assessment of the quality of training of students.

The evaluation of the quality of the development of the educational program is carried out in relation to the compliance of the results of the development of the program with the stated goals and planned learning outcomes.

### **Interim certification**

**A section or topic is considered mastered if the student has scored more than 50% of the possible number of points for this section.**

**Students are required to complete all assignments within the deadlines set by the schedule.**

### **Final certification**

A student who has no debt and has fully completed the curriculum of the educational program is allowed to complete the final certification.

Students who have scored < 37 points during the semester are not allowed to take the final assessment.

The final certification is carried out in the form of a credit.

According to the results of the test, marks are set according to the seven-point system ("excellent", "very good", "good", "satisfactory", "mediocre", "conditionally unsatisfactory", "certainly unsatisfactory").

When assessing the level of formation of competencies, knowledge and skills of students and marking, an additive principle is used (the principle of "addition"):

- "Excellent" - the theoretical content of the discipline is fully mastered, without gaps, the necessary practical skills of working with the mastered material are formed, all training tasks are completed, the quality of their performance is estimated by the number of points close to the maximum.

- "Very good" - the theoretical content of the discipline is fully mastered, without gaps, the necessary practical skills of working with the mastered material are mostly formed, all training tasks are completed, the quality of most of them is estimated by the number of points close to the maximum.

- "Good" – the theoretical content of the discipline is fully mastered, without gaps, some practical skills of working with the mastered material are not formed enough, all training tasks are completed, the quality of none of them is evaluated by the minimum number of points, some types of tasks are performed with errors.

- "Satisfactory" - the theoretical content of the discipline has been partially mastered, but the gaps are not significant, the necessary practical skills of working with the mastered material are mostly formed, most of the training tasks have been completed, some of the completed tasks may contain errors.

- "Mediocre" - the theoretical content of the discipline has been partially mastered, some practical work skills have not been formed, many training tasks have not been completed, or the quality of some of them is estimated by the number of points close to the minimum.

- "Conditionally unsatisfactory" - the theoretical content of the discipline has been partially mastered, the necessary practical skills have not been formed, most of the training tasks have not been completed, or the quality of their performance has been assessed by a number of points close to the minimum; with additional independent work on the course material, it is possible to improve the quality of the training tasks.

• "Certainly unsatisfactory" - the theoretical content of the discipline has not been mastered, the necessary practical work skills have not been formed, all completed training tasks contain gross errors, additional independent work on the course material will not lead to any significant improvement in the quality of training tasks.

## INDEPENDENT WORK OF A STUDENT

### List of homework assignments by discipline sections

№	Discipline section No.	Name of the type of independent work
1	1	Study of lecture material
2		Drawing up a subordinate structure of documents containing requirements for conducting engineering and environmental surveys and assessing the level of environmental impact of the city
3		Preparation of a presentation on the topic "Basic and special types of engineering surveys. General requirements for engineering and environmental surveys"
4	2	Study of lecture material
5		Preparation of technical specifications for the performance of engineering and environmental surveys, assessment of the impact of the object on the environment of the city
6		Drawing up a program for performing engineering and environmental surveys, assessing the impact of objects on the environment of the urban agglomeration
7	3	Study of lecture material
8		Preparatory stage of engineering and environmental surveys. Planning of route observations. Placement of geochemical sampling points
9		Preparation of an environmental audit program and examination of project documentation
10		Development of estimates for engineering and environmental surveys for construction, assessment of the impact of objects on the environment of the city based on collections of base prices, determination of the estimated cost of engineering and environmental surveys
11		Preparation of a report on the conduct of engineering and environmental surveys and geoecological assessment of the impact of the construction object on the environment of the city
12	4	Study of lecture material
13		Preparation of an individual project presentation

### Methodological recommendations for writing an abstract

An abstract is a summary in writing or in the form of a public speech of the contents of a book, scientific work, the results of the study of a scientific problem; a report on a specific topic, including a review of relevant literary and other sources.

The structure of the abstract: title page, content (work plan), introduction, main part (sections, subsections), conclusion, references, appendices (if available).

Each of these parts starts with a new page. The headings of the specified parts of the abstract are written in capital letters and placed in the center of the line. There should be an empty line between the title and the following text. In the introduction of the abstract, it is necessary to justify the

relevance of the chosen topic, briefly show the degree of its development, formulate the purpose of the work and the tasks that need to be solved in order to achieve this goal. In the main part, the content of the questions of the selected topic is disclosed in detail. The conclusion is the conclusions made independently by the student, for each of the sections of the abstract.

At the end of the work there is a list of references, which allows the author to document the reliability of the cited materials and shows the degree of study of the problem. The list of references includes only those sources that were directly studied when writing the work. Each source indicated in the list of references should be referenced in the text. The list of references has a continuous single numbering. The bibliographic description of the documents is carried out in accordance with the requirements of GOST 7.1-2003.

All figures and tables must be numbered and signed. The signature of the drawing goes immediately after the number of the drawing and is placed in the center of the page under the drawing. The signature of the table is also located in the center of the page, but is placed above the table. The table number is placed above the table caption after the word "Table" and is located "on the right edge". The numbering of figures and tables in the appendices is independent.

The appendix is the final part of the work, which has an additional, usually reference value, but is necessary for a more complete coverage of the topic. The content of the application can be very diverse: copies of original documents, excerpts from reporting materials, individual provisions from instructions and rules, etc. In form they can be text, tables, graphs, maps. Applications are placed after the list of references.

The work should be printed on one side of a sheet of white A4 paper. The font color should be black. For computer typing, we recommend a size of 13, single line spacing, typeface – Times New Roman. The dimensions of the upper and lower margins are 20 mm, the left margin is 30 mm, the right margin is 10 mm. The paragraph indent is 1.27 cm. The main text of the work should be aligned in width.

#### **Topics of abstracts:**

1. Specifics of carrying out engineering and environmental surveys of transport infrastructure
2. Specifics of conducting engineering and environmental surveys of the oil and gas complex
3. Specifics of carrying out engineering and environmental surveys for water intakes of household and drinking water supply
4. Specifics of conducting engineering and environmental surveys of civil construction
5. Gas-geochemical research as part of the IEI
6. Determination of the radon hazard of the territory, devices, normalized indicators
7. Measurement of the gamma background within the study area during the IEI
8. Thematic maps compiled during the implementation of the IEI
9. Ecological framework of the territory
10. Geoecological testing of soils, bottom sediments, selection methods, regulatory documents
11. Vibration. Means of measurement and control in the workplace. Technical requirements
12. Preparation of the soil passport
13. Soil sampling, soil geochemical studies
14. Sampling of bottom sediment, regulatory framework
15. Air sampling, regulatory framework
16. Sinking of mine workings as part of the IEI
17. Devices and devices for sampling, primary processing and storage of natural water samples. General technical requirements.
18. Requirements for the water quality of non-centralized water supply. Sanitary protection of sources
19. Instrumentation for engineering and environmental surveys
20. The problem of conducting IEI in hard-to-reach areas
21. Conducting an IEI examination

## List of information sources on the study of the sections of the discipline

Name of the discipline section	List of information sources
Regulatory and technical documentation for engineering and environmental surveys and urban agglomeration development	<p>1. Колесников Е.Ю. Оценка воздействия на окружающую среду. Экспертиза безопасности: учебник и практикум для вузов / Е. Ю. Колесников, Т. М. Колесникова. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 471 с. – (Высшее образование). – ISBN 978-5-534-15905-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/510250">https://urait.ru/bcode/510250</a>.</p> <p>2. Ларионов Н.М. Промышленная экология: учебник и практикум для вузов / Н.М. Ларионов, А.С. Рябышенков. – 3-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 441 с. – (Высшее образование). – ISBN 978-5-534-15302-6. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/510668">https://urait.ru/bcode/510668</a>.</p> <p>3. Латышенко К.П. Экологический мониторинг: учебник и практикум для вузов / К.П. Латышенко. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 424 с. – (Высшее образование). – ISBN 978-5-534-13721-7. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/511478">https://urait.ru/bcode/511478</a>.</p> <p>4. Мананков А.В. Урбозоология и техносфера: учебник и практикум для вузов / А.В. Мананков. – Москва: Издательство Юрайт, 2023. – 494 с. – (Высшее образование). – ISBN 978-5-534-06909-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/515032">https://urait.ru/bcode/515032</a>.</p> <p>5. Поисковые системы Yandex, Google</p>
Types of research, obtaining, systematization and processing of primary environmental and geocological information	<p>1. Колесников Е.Ю. Оценка воздействия на окружающую среду. Экспертиза безопасности: учебник и практикум для вузов / Е. Ю. Колесников, Т. М. Колесникова. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 471 с. – (Высшее образование). – ISBN 978-5-534-15905-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/510250">https://urait.ru/bcode/510250</a>.</p> <p>2. Ларионов Н.М. Промышленная экология: учебник и практикум для вузов / Н.М. Ларионов, А.С. Рябышенков. – 3-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 441 с. – (Высшее образование). – ISBN 978-5-534-15302-6. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/510668">https://urait.ru/bcode/510668</a>.</p> <p>3. Латышенко К.П. Экологический мониторинг: учебник и практикум для вузов / К.П. Латышенко. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 424 с. – (Высшее образование). – ISBN 978-5-534-13721-7. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/511478">https://urait.ru/bcode/511478</a>.</p> <p>4. Мананков А.В. Урбозоология и техносфера: учебник и практикум для вузов / А.В. Мананков. – Москва: Издательство Юрайт, 2023. – 494 с. – (Высшее образование).</p>

Name of the discipline section	List of information sources
	<p>образование). – ISBN 978-5-534-06909-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/515032">https://urait.ru/bcode/515032</a>.</p> <p>5. Поисковые системы Yandex, Google</p> <p>6. Информационные справочные системы: научная электронная библиотека E-library, Электронно-библиотечная система «Университетская библиотека online», Электронно-библиотечная система издательства «Лань», Электронно-библиотечная система издательства «Юрайт», Национальный цифровой ресурс Руконт – межотраслевая электронная библиотека (ЭБС)</p>
Types of work: stages and content of engineering and environmental surveys taking into account the trajectory and route of development of the city	<p>1. Колесников Е.Ю. Оценка воздействия на окружающую среду. Экспертиза безопасности: учебник и практикум для вузов / Е. Ю. Колесников, Т. М. Колесникова. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 471 с. – (Высшее образование). – ISBN 978-5-534-15905-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/510250">https://urait.ru/bcode/510250</a>.</p> <p>2. Ларионов Н.М. Промышленная экология: учебник и практикум для вузов / Н.М. Ларионов, А.С. Рябышенков. – 3-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 441 с. – (Высшее образование). – ISBN 978-5-534-15302-6. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/510668">https://urait.ru/bcode/510668</a>.</p> <p>3. Латышенко К.П. Экологический мониторинг: учебник и практикум для вузов / К.П. Латышенко. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 424 с. – (Высшее образование). – ISBN 978-5-534-13721-7. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/511478">https://urait.ru/bcode/511478</a>.</p> <p>4. Мананков А.В. Урбоэкология и техносфера: учебник и практикум для вузов / А.В. Мананков. – Москва: Издательство Юрайт, 2023. – 494 с. – (Высшее образование). – ISBN 978-5-534-06909-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/515032">https://urait.ru/bcode/515032</a>.</p>
Engineering and environmental surveys on the main industrial objects of the city	<p>1. Колесников Е.Ю. Оценка воздействия на окружающую среду. Экспертиза безопасности: учебник и практикум для вузов / Е. Ю. Колесников, Т. М. Колесникова. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 471 с. – (Высшее образование). – ISBN 978-5-534-15905-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/510250">https://urait.ru/bcode/510250</a>.</p> <p>2. Ларионов Н.М. Промышленная экология: учебник и практикум для вузов / Н.М. Ларионов, А.С. Рябышенков. – 3-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 441 с. – (Высшее образование). – ISBN 978-5-534-15302-6. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/510668">https://urait.ru/bcode/510668</a>.</p>

Name of the discipline section	List of information sources
	<p>3. Латышенко К.П. Экологический мониторинг: учебник и практикум для вузов / К.П. Латышенко. – 2-е изд., перераб. и доп. – Москва: Издательство Юрайт, 2023. – 424 с. – (Высшее образование). – ISBN 978-5-534-13721-7. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/511478">https://urait.ru/bcode/511478</a>.</p> <p>4. Мананков А.В. Урбоэкология и техносфера: учебник и практикум для вузов / А.В. Мананков. – Москва: Издательство Юрайт, 2023. – 494 с. – (Высшее образование). – ISBN 978-5-534-06909-9. – Текст: электронный // Образовательная платформа Юрайт [сайт]. – URL: <a href="https://urait.ru/bcode/515032">https://urait.ru/bcode/515032</a>.</p> <p>5. Поисковые системы Yandex, Google</p>

### List of questions and tasks for self-examination

1. The purpose of performing engineering surveys for the preparation of project documentation, construction, reconstruction of capital construction facilities
2. What is the basis for performing engineering surveys, who determines the scope of the necessary surveys?
3. List the main types of engineering surveys
4. List the special types of engineering surveys
5. What is included in the engineering and environmental surveys?
6. What should include a Route geocological survey of built-up areas?
7. Why are Soil studies performed?
8. Why should testing and assessment of contamination of surface and groundwater be carried out during engineering and environmental surveys?
9. What should radiation and environmental studies include?
10. What should Stationary environmental observations include?
11. In what cases are stationary environmental observations carried out?
12. What should include a route survey of the site and the surrounding area?
13. Classification and forms of environmental pollution (pollutants)
14. Structure and principles of environmental regulation
15. Basic concepts and methods of establishing maximum permissible concentrations
16. Nitrogen oxides as a source of atmospheric air pollution (sources of atmospheric air intake, effects on the human body, maximum permissible maximum single concentration in atmospheric air)
17. Suspended substances (concept, composition, sources of entry into the atmospheric air)
18. Sulfur dioxide (sources of entry into the atmospheric air, effects on the human body, maximum permissible maximum single concentration in the atmospheric air)
19. Carbon monoxide (sources of entry into the atmospheric air, effects on the human body, maximum permissible maximum single concentration in the atmospheric air)
20. Polynuclear aromatic hydrocarbons (concept, sources of entry into the atmospheric air, effects on the human body)
21. Types and procedure for determining the maximum permissible concentrations of pollutants in the air of the working area
22. Types and procedure for determining the maximum permissible concentrations of pollutants in the air of settlements
23. Limiting signs of harmfulness established when rationing the maximum permissible concentrations in the air of settlements
24. Categories of water use according to the SanPiN

25. List of normalized indicators in wastewater by epidemiological indicator
26. Bacteria of the E. coli group (characteristic of the group, sanitary and indicative value)
27. Which water bodies are not allowed to discharge wastewater?
28. Limiting signs of harmfulness established when rationing the maximum permissible concentrations in water for household and drinking purposes
29. Determination of the smell of natural waters (causes of occurrence, assessment of the nature of the smell, the intensity of the smell)
30. Transparency of natural waters (concept, method of determination)
31. pH (concept, scale of values, MPC in drinking water)
32. BOD, COD (concept, method of determination, MPC in water for household and drinking purposes)
33. Water objects of fishery purpose (concept, categories)
34. Limiting signs of harmfulness established when rationing maximum permissible concentrations in fishery water
35. Zones of sanitary protection of sources of household and drinking purposes (definition, examples of the regime of sanitary protection zones)
36. Epidemiological indicators of drinking water quality standards
37. General exchange indicators of drinking water quality standards
38. Limiting signs of harmfulness established when rationing the maximum permissible concentrations in drinking water
39. Mineralization and hardness of drinking water (concept, differences in definition, impact on human health)
40. The process of mineralization of organic matter (sanitary indicative value)
41. Ways to improve the quality of drinking water
42. List of organoleptic indicators of drinking water quality
43. Determination of the taste of drinking water (causes, assessment of the nature of the taste, the intensity of the taste)
44. Determination of the color of drinking water (concept, method of determination)
45. Determination of turbidity of drinking water (concept, method of determination)
46. List of radiation indicators of drinking water quality
47. Definitions of "soil profile", "soil horizon" and "soil cover"
48. Organogenic type of soil horizon (examples, general characteristics)
49. Eluvial and illuvial type of soil horizon (examples, general characteristics)
50. Humus of soil cover (concept, composition)
51. List of high-risk zones in the normalization of soil quality of settlements
52. List of sanitary indicators normalized when assessing soil quality
53. Examples of anthroponotic and zooanthroponotic infections transmitted through contaminated soil
54. The concept of persistence
55. Limiting signs of harmfulness that are suspended during the normalization of soil quality
56. Activity of radionuclides (concept, units of measurement)
57. Alpha decay (general characteristic, Soddy displacement rule for alpha decay, biological effect)
58. Beta (minus) decay (general characteristic, Soddy displacement rule for beta(minus) decay, biological effect)
59. General characteristics of gamma and X-ray radiation
60. Types of ionizing radiation by penetrating power
61. Types of ionizing radiation by linear energy transfer
62. Radioactive families of natural radioisotopes (general rule for determining the mass number)
63. Exposure dose of ionizing radiation (concept, units of measurement)
64. Absorbed dose of ionizing radiation (concept, units of measurement)
65. Equivalent dose of ionizing radiation (concept, units of measurement)

66. Dose rate (concept, unit of measurement)
67. Exposure dose rate of ionizing radiation (concept, units of measurement)
68. Power of the absorbed dose of ionizing radiation (concept, units of measurement)
69. Power of the equivalent dose of ionizing radiation (concept, units of measurement)
70. The law of radioactive decay
71. What is the difference between the concepts of isotope, isomer, nuclide?
72. Classification of ionizing radiation sources
73. Types of natural sources of ionizing radiation
74. Types of cosmic radiation as a source of ionizing effects
75. Natural radioisotopes of uranium
76. Natural radioisotopes of thorium
77. Natural radioisotopes of actinium
78. Natural radon radioisotopes
79. Natural radioisotopes of polonium
80. Natural radioisotopes of lead
81. General characteristics of radioactivity of rocks
82. General characteristics of soil radioactivity
83. General characteristics of radioactivity of natural waters
84. General characteristics of atmospheric air radioactivity