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**Federal State Autonomous Educational Institution for Higher Education  
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA (RUDN  
University) named after Patrice Lumumba  
Institute of Environmental Engineering**

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## **COURSE SYLLABUS**

# **Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools**

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**Recommended by the Didactic Council for the Education Field for the specialization:  
05.04.06 "Ecology and nature management"**

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

«Integrated Solid Waste Management» (Network program with L.N. Gumilyov Eurasian National  
University)

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## 1. COURSE GOAL(s)

The course is designed to help students the in-depth study of the method of remote sensing of the Earth and the features of its application for solving the problems of integrated management of production and consumption waste.

## • 2. REQUIREMENTS FOR COURSE OUTCOMES

The course implementation is aimed at the development of the following competences:

**GC -3.1; GC -3.2; GC -7.1; GC -7.2; GC -7.3; SPC -4.1; SPC -4.2; SPC -4.3; PC -1.1; PC -1.2; PC -6.1; PC -6.2; PC -6.3**

| Competence code | Competence descriptor                                                                                                                                                                                                                                                                                                                 | Competence formation indicators<br>(within this course)                                                                                                                                                                                                                          |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GC -3           | Able to organize and manage the work of the team, developing a team strategy to achieve the goal                                                                                                                                                                                                                                      | GC -3.1 Has the skills to control the fulfillment of requirements                                                                                                                                                                                                                |
|                 |                                                                                                                                                                                                                                                                                                                                       | GC -3.2 Is able to develop a team work plan for activities aimed at meeting the requirements in the field of environmental protection, taking into account best practices                                                                                                        |
| GC-7            | Able to use basic knowledge in the field of information culture                                                                                                                                                                                                                                                                       | GC-7.1 Able to use basic knowledge in the field of information culture                                                                                                                                                                                                           |
|                 |                                                                                                                                                                                                                                                                                                                                       | GC-7.2 Formulates a real data processing problem in terms of a real problem                                                                                                                                                                                                      |
|                 |                                                                                                                                                                                                                                                                                                                                       | GC-7.3 Knows the principles and techniques of modern corporate information culture and the basics of the digital economy                                                                                                                                                         |
| GPC-4           | Able to apply regulatory legal acts in the field of ecology and nature management, norms of professional ethics                                                                                                                                                                                                                       | GPC-4.1 Models and predicts the behavior of natural and natural-technogenic ecosystems of varying degrees of complexity, finds ways to optimize them                                                                                                                             |
|                 |                                                                                                                                                                                                                                                                                                                                       | GPC -4.2 Knows the international practice of development and harmonization, as well as the application of environmental standards                                                                                                                                                |
|                 |                                                                                                                                                                                                                                                                                                                                       | GPC -4.3 Has the skills to analyze the need for environmental protection measures based on the application of environmental standards, the skills to select and apply indicators for environmental expertise and forms of environmental control based on environmental standards |
| PC-1            | the ability to formulate problems, tasks and methods of scientific research, to obtain new reliable facts based on observations, experiments, scientific analysis of empirical data, to abstract scientific works, to compile analytical reviews of accumulated information in world science and production activities, to generalize | PC-1.1 Able to evaluate scientific (scientific and technical) results obtained in Russia and (or) abroad in new and (or) promising scientific areas                                                                                                                              |
|                 |                                                                                                                                                                                                                                                                                                                                       | PC-1.2 Has the skills to evaluate the key characteristics of scientific (scientific and technical) results in the form of reviews, conclusions, reviews                                                                                                                          |

|             |                                                                                                                                                                                                  |                                                                                                                                                                                |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | the results obtained in the context of previously accumulated in science knowledge and formulate conclusions and practical recommendations based on representative and original research results |                                                                                                                                                                                |
| <b>PC-6</b> | the ability to diagnose problems of nature conservation, develop practical recommendations for its protection and sustainable development                                                        | <b>PC-6.1</b> Able to carry out the necessary calculations for planning, modeling and forecasting the development of a territorial object                                      |
|             |                                                                                                                                                                                                  | <b>PC-6.2</b> Able to analyze and evaluate the available resources and conditions necessary for the implementation of research                                                 |
|             |                                                                                                                                                                                                  | <b>PC-6.3</b> Capable of conducting spatial, territorial, demographic, sociological, economic research, topographic and geodetic, engineering geological, cartographic surveys |

As a result of course studying, the student must:

**Know:**

- Technological solutions for the remediation of contaminated areas.
- General issues of work on rehabilitation and arrangement of disturbed lands.
- Classification of disturbed lands according to technogenic relief and area.
- Types of natural-technogenic landscapes.
- Stages of remediation of natural and technogenic landscapes

**Be able to:**

- correctly classify the objects of accumulated damage to the environment,
- reasonably choose methods of remediation of objects of accumulated damage to the environment,
- evaluate the environmental and economic efficiency of the measures taken;

**Own :**

- methods of drawing up schemes for the integrated remediation of disturbed lands and water bodies,
- the skills of choosing the best available technology for eliminating the damage to the environment.

### 3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

Discipline *Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools* refers to the Variative part of the curriculum.

Within the higher education programme students also master other disciplines (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the course.

**Table 3.1**

*The list of the higher education programme components that contribute to the achievement of the expected learning outcomes*

| Competence code | Competence descriptor                                                                            | Previous courses/modules, internships*      | Subsequent courses/modules, internships*                                                                                    |
|-----------------|--------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>GC -3</b>    | Able to organize and manage the work of the team, developing a team strategy to achieve the goal | Regional & Municipal MSW Management Systems | Research work in the term including projects / Industrial / pedagogical Internship<br>Research work on thesis<br>State Exam |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                       |                                                                                                                                               |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                       | degree Diploma                                                                                                                                |
| <b>GC-7</b>  | Able to use basic knowledge in the field of information culture                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -                                                                                                                                                     | Research work in the term including projects / Industrial / pedagogical Internship<br>Research work on thesis<br>State Exam<br>degree Diploma |
| <b>GPC-4</b> | Able to apply regulatory legal acts in the field of ecology and nature management, norms of professional ethics                                                                                                                                                                                                                                                                                                                                                                                                                        | Landscape and geochemical aspects of waste impact                                                                                                     | Research work in the term including projects / Industrial / pedagogical Internship<br>Research work on thesis<br>State Exam<br>degree Diploma |
| <b>PC-1</b>  | the ability to formulate problems, tasks and methods of scientific research, to obtain new reliable facts based on observations, experiments, scientific analysis of empirical data, to abstract scientific works, to compile analytical reviews of accumulated information in world science and production activities, to generalize the results obtained in the context of previously accumulated in science knowledge and formulate conclusions and practical recommendations based on representative and original research results | -                                                                                                                                                     | Research work in the term including projects / Industrial / pedagogical Internship<br>Research work on thesis<br>State Exam<br>degree Diploma |
| <b>PC-6</b>  | the ability to diagnose problems of nature conservation, develop practical recommendations for its protection and sustainable development                                                                                                                                                                                                                                                                                                                                                                                              | Landscape and geochemical aspects of waste impact<br>National and international aspects of radioactive waste management<br>Ecotoxicokinetics of waste | Research work in the term including projects / Industrial / pedagogical Internship<br>Research work on thesis<br>State Exam<br>degree Diploma |

#### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the discipline is **4** credit units.

Table 4.1. Types of academic activities during the period of the HE program(me) mastering

| Types of academic activities                               | Total hours | Semester(s) |            |   |   |
|------------------------------------------------------------|-------------|-------------|------------|---|---|
|                                                            |             | 1           | 2          | 3 | 4 |
| <i>Contact academic hours</i>                              |             |             |            |   |   |
| Lectures                                                   | 17          | 17          |            |   |   |
| Lab works                                                  |             |             |            |   |   |
| Seminars (workshops/tutorials)                             | 17          | 17          |            |   |   |
| <i>Self-study</i>                                          | 47          | 90          |            |   |   |
| <i>Evaluation and assessment (exam; pass/fail grading)</i> | 27          | 33          |            |   |   |
| <b>The total course workload</b>                           | hours       | <b>144</b>  | <b>144</b> |   |   |
|                                                            | credits     | <b>4</b>    | <b>4</b>   |   |   |

## 5. COURSE CONTENT

Table 5.1. Course Modules and Contents

| Title of Course Modules |                                                                                                  | Content                                                                                                                                                                                   | Types of academic activities |
|-------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1.                      | Introduction                                                                                     | The main sources of accumulated environmental damage and the features of its impact on the environment.                                                                                   | L, S                         |
|                         |                                                                                                  | Foreign experience in the elimination of objects of accumulated harm to the environment<br>The scale of accumulated harm and the experience of land rehabilitation in Europe and the USA. |                              |
|                         | Classification of AED objects                                                                    | Approaches to the classification of objects of accumulated environmental damage. Assignment criteria                                                                                      | L, S                         |
|                         |                                                                                                  | Classification of technological solutions (methods) for the rehabilitation of objects of accumulated harm.                                                                                |                              |
|                         |                                                                                                  | Classification of disturbed lands according to technogenic relief and area. Types of natural-technogenic landscapes.                                                                      |                              |
|                         | Stages of restoration of natural-technogenic landscapes. Examples of the most dangerous objects. | Stages of restoration of natural and technogenic landscapes                                                                                                                               | L, S                         |
|                         |                                                                                                  | Formation of vegetation cover on dumps and artificial reservoirs                                                                                                                          |                              |
|                         |                                                                                                  | Requirements for the reclamation of lands disturbed during the construction and operation of linear structures                                                                            |                              |
|                         |                                                                                                  | Peculiarities of Rehabilitation of Certain Objects of Accumulated Damage to the Environment AED and Specific Territories                                                                  | L, S                         |
|                         |                                                                                                  | Restoration of water bodies                                                                                                                                                               |                              |
|                         |                                                                                                  | Features of reclamation of MSW landfills as objects of accumulated harm                                                                                                                   |                              |

## 6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

*Table 6.1. Classroom equipment and technology support requirements*

| Classroom for Academic Activity Type | Classroom equipment                                                                                                                                                                                                                                  | Specialized educational / laboratory equipment, software and materials for mastering the course (if necessary)                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lecture                              | Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless                                                                             | Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless                                                                                                                                                                                                                                                                              |
| Seminars                             | Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless                                                                             | Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, stable wireless Internet connection. Software: Microsoft Windows, MS Office / Office 365, MS Teams, Chrome (latest stable release), Skype. Microsoft Windows 7 corporate. License No. 5190227, date of issue March 16, 2010 MS Office 2007 Prof, License # 6842818, date of issue 09/07/2009 |
| Computer Lab                         | Computer Lab for conducting classes, group and individual consultations, current control and intermediate certification, equipped with personal computers (in the amount of 12), a board (screen) and technical devices of multimedia presentations. | No                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| For Self-Study                       | Classroom for self-study (can be used for seminars and consultations), equipped with a set of devices includes laptop, stable wireless.                                                                                                              | No                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## 7. RECOMMENDED SOURCES FOR COURSE STUDIES

### a) Main reading:

1. Kharlamova MD Kurbatova AI Modern Technologies of Waste Management, Recycling and Environmental Protection / Modern methods of waste management, recycling and environmental protection - M. : RUDN University, 2017. - 98 p. : ill. Text/electronic resource RUDN Library
- 2 Evans Virginia Evans, J. Dooley, K. Rodgers. Environmental Engineering Book 1, 2, 3 / V. Newbery : Express Publishing, 2013. - 38, 40, 41 p Textbook on the English language Library RUDN University
3. Cumulative Effects Assessment Integrated Environmental Management Information Series Department of Environmental Affairs and Tourism Pretoria, 2004, 22p
4. Runge, K. (1998). The Assessment of Cumulative Environmental Impacts in EIA and Land-Use Planning. In: Breuste, J., Feldmann, H., Uhlmann, O. (eds) Urban Ecology. Springer, Berlin, Heidelberg. [https://doi.org/10.1007/978-3-642-88583-9\\_87](https://doi.org/10.1007/978-3-642-88583-9_87)
5. Land remediation and waste management guidelines Scottish Environment Protection Agency, 18p

6. Daiwen Zhu Research on Remediation Methods of Contaminated Land and Development Trend Environment, Resource and Ecology Journal (2018) 2: 15-21 Clausius Scientific Press, Canada
7. Managing Land Contamination Planning Guidelines SEPP 55–Remediation of Land Department of Urban Affairs and Planning • Environment Protection Authority 1998, 64p
8. D.M. Hamby SITE REMEDIATION TECHNIQUES SUPPORTING ENVIRONMENTAL RESTORATION ACTIVITIES: A REVIEW Department of Environmental and Industrial Health School of Public Health University of Michigan U.S.A.1994, 32 p

#### b) **Additional reading**

1. FM Koroma, Kharlamova M Waste management in african counties: social and environmental features - 2016. - No. 2. - S. 84 - 94. Article  
Electronic text data <http://journals.rudn.ru/ecology/article/view/12907/12337> RUDN Library
2. Doris Baah, Kharlamova M. Oilspill response on the western region of Ghana: environmental management problems [Text ] - 2016. - No. 3. - S. 83 - 92. Article  
Electronic text data <http://journals.rudn.ru/ecology/article/view/14453/13589>
3. Solomon, Gina. (2016). Cumulative Environmental Impacts. Annual Review of Public Health. 37. 10.1146/annurev-publhealth-032315-021807.
4. Assessment of the Possible Cumulative Environmental Impacts of Commercial Ship-Based Tourism in the Antarctic Peninsula Area Proceedings of a Workshop Held in La Jolla, California, 7–9 June 2000 Robert J. Hofman (retired), Marine Mammal Commission Joyce Jatko, Environmental Officer, Office of Polar Programs, 94 p

#### *Internet-based sources*

1. ELS of RUDN University and third-party ELS, to which university students have access on the basis of concluded agreements:
  - RUDN Electronic Library System - RUDN EBS <http://lib.rudn.ru/MegaPro/Web>
  - ELS "University Library Online" <http://www.biblioclub.ru>
  - EBS Yurayt <http://www.biblio-online.ru>
  - ELS "Student Consultant" [www.studentlibrary.ru](http://www.studentlibrary.ru)
  - EBS "Lan" <http://e.lanbook.com/>
  - EBS "Trinity Bridge"
2. Databases and search engines:
  - electronic fund 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/>
  - abstract database SCOPUS [http:// www .elsevierscience.ru/ products / scopus /](http://www.elsevierscience.ru/products/scopus/)

## **8. MID-TERM ASSESSMENT AND EVALUATION TOOLKIT**

Evaluation materials and a point- rating system\* for assessing the level of competence formation (part of competences) based on the results of mastering the discipline **Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools** are presented in the Appendix to this course syllabus.

#### **DEVELOPER:**

Associate Professor of the EM  
Department

**Kapralova D.O.**

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Position

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Signature

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Name, Surname

**HEAD OF DEPARTMENT:**

Director of the EM Department

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Position

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Signature

**Kucher D.E.**

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Name, Surname

**HEAD OF PROGRAMME:**

Associate Professor of the  
ES&PQM Department

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Position

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Signature

**Popkova A.V.**

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Name, Surname



## **Department Environmental Management**

APPROVED

Department meeting protocol No \_\_\_\_\_,

Dated \_\_\_\_\_

day, month, year

Head of Educational Department

\_\_\_\_\_ (Kucher D.E.)

signature

# **ASSESSMENT TOOLKIT**

**for the course**

## **Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools**

course title

05.04.06 "Ecology and nature management"

field of studies / speciality code and title

«Integrated Solid Waste Management» (Network program with L.N. Gumilyov Eurasian National  
University)

higher education programme profile/specialisation title

**master**

graduate's qualification (degree)

# Passport to Assessment Toolkit for Course **Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools**

Field of Studies / Speciality 05.04.06 "Ecology and nature management"

code

title

Course: Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools

title

| Competences<br>(competences<br>in part )<br>under<br>assessment | Course<br>module<br>under<br>assessment          | Course topic under assessment                                                                                                                                                                     | Tools to assess higher education programme<br>mastering level |      |        |         |         |              |                                    |                                  | Points<br>for<br>topic | Points<br>for<br>module |
|-----------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------|--------|---------|---------|--------------|------------------------------------|----------------------------------|------------------------|-------------------------|
|                                                                 |                                                  |                                                                                                                                                                                                   | Class work                                                    |      |        |         |         | Self-studies |                                    | Exam/Pass-<br>fail<br>assessment |                        |                         |
|                                                                 |                                                  |                                                                                                                                                                                                   | Quiz                                                          | Test | Report | Seminar | Lection | Homework     | Calculation<br>and graphic<br>work |                                  |                        |                         |
| <b>GPC-4</b>                                                    | Module 1:<br>Introduction                        | Topic 1: The main sources of accumulated environmental damage and the features of its impact on the environment                                                                                   | 1                                                             | 2    |        | 0,5     | 0,5     | 5            |                                    | 2                                | 6                      | 11                      |
|                                                                 |                                                  | Topic 2: Foreign experience in the elimination of objects of accumulated harm to the environment<br>The scale of accumulated harm and the experience of land rehabilitation in Europe and the USA | 1                                                             | 1    |        | 0,5     | 0,5     |              |                                    | 2                                | 5                      |                         |
| <b>GC -3<br/>GPC-4<br/>PC-6</b>                                 | Module 2:<br>Classification<br>of AED<br>objects | Topic 1: Approaches to the classification of objects of accumulated environmental damage. Assignment criteria                                                                                     | 1                                                             | 2    |        | 0,5     | 0,5     |              |                                    | 1                                | 5                      | 20                      |

|                                                                           |                                                                                                           |                                                                                                                                   |    |    |    |     |     |    |    |    |     |  |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----|----|----|-----|-----|----|----|----|-----|--|
|                                                                           |                                                                                                           | Topic 2: Classification of technological solutions (methods) for the rehabilitation of objects of accumulated harm                | 1  | 2  |    | 0,5 | 0,5 |    | 5  | 2  | 11  |  |
|                                                                           |                                                                                                           | Topic 3: Classification of disturbed lands according to technogenic relief and area. Types of natural-technogenic landscapes.     | 1  | 2  |    | 0,5 | 0,5 |    |    | 2  | 6   |  |
| <b>GC -3</b><br><b>GC-7</b><br><b>GPC-4</b><br><b>PC-1</b><br><b>PC-6</b> | Module 3: Stages of restoration of natural-technogenic landscapes. Examples of the most dangerous objects | Topic 1: Stages of restoration of natural and technogenic landscapes                                                              | 2  | 2  |    | 0,5 | 0,5 |    |    | 1  | 6   |  |
|                                                                           |                                                                                                           | Topic 2: Formation of vegetation cover on dumps and artificial reservoirs                                                         | 2  | 2  | 10 | 0,5 | 0,5 |    | 5  | 1  | 21  |  |
|                                                                           |                                                                                                           | Topic 3: Requirements for the reclamation of lands disturbed during the construction and operation of linear structures           | 2  | 1  |    | 0,5 | 0,5 |    |    | 2  | 6   |  |
|                                                                           |                                                                                                           | Topic 4: Peculiarities of Rehabilitation of Certain Objects of Accumulated Damage to the Environment AED and Specific Territories | 2  | 2  |    | 0,5 | 0,5 |    |    | 1  | 6   |  |
|                                                                           |                                                                                                           | Topic 5: Restoration of water bodies                                                                                              | 2  | 2  |    | 0,5 | 0,5 |    | 5  | 1  | 11  |  |
|                                                                           |                                                                                                           | Topic 6: Features of reclamation of MSW landfills as objects of accumulated harm                                                  | 2  | 2  |    | 0,5 | 0,5 | 5  | 5  | 2  | 17  |  |
|                                                                           |                                                                                                           | Total                                                                                                                             | 17 | 20 | 10 | 5,5 | 5,5 | 10 | 20 | 17 | 100 |  |

# Passport to Assessment Toolkit for Course **Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools**

course title

## QUESTION CARD No

QUESTION 1 Wastes that are generated during the enrichment of mined minerals

QUESTION 2 Type of reclamation intended for preliminary preparation of disturbed areas for various uses

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**Developer** \_\_\_\_\_ (Kapralova D.O.)  
signature

Head of Educational Department \_\_\_\_\_ (Kucher D.E.)  
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)*

## Test question examples

- 1) The most important criterion for establishing the sequence of actions for the liquidation of a specific object of AED:
  - A) the level of environmental safety
  - B) area of the Object
  - C) the mass of accumulated production and consumption waste
  - D) remoteness of the Object from the residential area
- 2) What is the purpose of processing metal-containing sludge?
  - a) - saving electrical energy
  - b) -increasing the efficiency of industry
  - c) -- improvement of the environmental situation
  - d) - to create additional jobs.
- 7) The components of waste rubber products (RTI) include:
  - a) - oil b) - methane
  - c) - pine oil
  - d) - rubber.
- 8) How is coal preparation waste used?
  - 1) - as a mineral fertilizer
  - 2) - as fuel
  - 3) - as an element of building materials
  - 4) - as an element in the manufacture of furniture.
- 9) What methods relate to the thermal processing of waste.
  - a) - pyrolysis
  - b) - extraction
  - c) - leaching

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)*

The assessment of all results of mastering competencies is carried out in accordance with the scale of the international point-rating system ECTS. In accordance with the calculated grading system, the student gains the required points.

Work in class: depends on the complexity of the topic.

The grade is given for attendance and active work at a seminar or lecture (lectures are held in an interactive form) - answers to current questions, notes, discussion. The student is present at the lesson, participates in the discussion, does not hesitate to answer questions - maximum score. The student is absent or the task is not prepared - 0 points.

Tasks of Self-studies: - acquisition of skills of independent practical work in the recommended software and application of various research methods; - developing the ability to independently and critically apply the material being studied. The SR technology should ensure the acquisition of knowledge, the consolidation and systematization of knowledge, the formation of skills and abilities. The proven technology is characterized by an algorithm that includes the following logically related student actions: - reading a text (textbook, manual, lecture notes); - note-taking of the text; - problem solving and exercises; - answers to control questions;

Final certification: A student is considered to have successfully passed the milestone or final certification if the total score for all activities at the time of certification exceeds 50% of the maximum possible score (lecture work, practical assignment, tests).

The final grade for the semester is added up as the sum of points for all types of student activities (\*see toolkit passport) and can reach a maximum of 83 points.

The final test is given by the student voluntarily, if he scored the minimum possible score for certification - 51 points. In other cases, the exam/pass/fail assessment is mandatory and is estimated at a maximum of 17 points, as a result, the total score is derived taking into account the result of passing the test and the final grade corresponds to the international ECTS scale.

### Tentative list of assessment tools

| II<br>/<br>II     | Assessment tool                                                            | Brief features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Assessment tool representation in the kit                        |
|-------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <i>Class work</i> |                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                  |
| 1                 | Survey/Quiz                                                                | A tool of control, organized 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                                                       |
| 9.                | Presentation (defence) of project/report/ Library research paper /briefs * | A tool for monitoring the students' ability to present the work results to the audience.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Themes for 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                  |
| 14                | Multi-level tasks and assignments with varying difficulty                  | The tasks and assignments differ in terms of the following levels:<br>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,<br>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, | Set of multi-level tasks and assignments with varying difficulty |

|                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                  |
|----------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
|                      |                              | c) creative level allows to evaluate and diagnose students' skills to integrate knowledge of various fields, argue their own point of view.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                  |
| <b>Self- studies</b> |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                  |
| 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                    |
| 8                    | Homework                     | The tasks and assignments differ in terms of the following levels:<br>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,<br>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,<br>c) creative level allows the teacher to evaluate and diagnose students' skills to integrate knowledge of various fields, argue their own point of view. | Set of multi-level tasks and assignments with varying difficulty |

### Criteria for assessing students' knowledge

| Points BRS | Traditional grades in the Russian Federation | Points for transferring grades | Grades | ECTS grades |
|------------|----------------------------------------------|--------------------------------|--------|-------------|
| 86 - 100   | 5                                            | 95 – 100                       | 5+     | A           |
|            |                                              | 86 – 94                        | 5      | B           |
| 69 - 85    | 4                                            | 69 – 85                        | 4      | C           |
| 51 - 68    | 3                                            | 61 - 68                        | 3+     | D           |
|            |                                              | 51 - 60                        | 3      | E           |
| 0 - 50     | 2                                            | 31 - 50                        | 2+     | FX          |
|            |                                              | 0 - 30                         | 2      | F           |

#### Explanation of the rating table:

|          |                                                                                                                                                                                                                                                                                                                                                     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A</b> | “Excellent” - the theoretical content of the course is mastered completely, without gaps, the necessary practical skills for working with the mastered material are formed, all the training tasks provided for by the training program are completed, the quality of their implementation is estimated by a number of points close to the maximum. |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>B</b>  | “Very good” - the theoretical content of the course is mastered completely, without gaps, the necessary practical skills for working with the mastered material are basically formed, all the training tasks provided for by the training program are completed, the quality of most of them is estimated by a number of points close to the maximum.                                                                                                                                               |
| <b>C</b>  | “Good” - the theoretical content of the course has been mastered completely, without gaps, some practical skills in working with the mastered material are not sufficiently formed, all the training tasks provided for by the training program have been completed, the quality of none of them has been assessed with a minimum number of points, some types of tasks have been completed with errors.                                                                                            |
| <b>D</b>  | “Satisfactory” - the theoretical content of the course has been partially mastered, but the gaps are not significant, the necessary practical skills for working with the mastered material are basically formed, most of the training tasks provided for by the training program have been completed, some of the completed tasks may contain errors.                                                                                                                                              |
| <b>E</b>  | “Mediocre” - the theoretical content of the course is partially mastered, some practical work skills are not formed, many training tasks provided for by the training program are not completed, or the quality of some of them is estimated by a number of points close to the minimum.                                                                                                                                                                                                            |
| <b>FX</b> | “Conditionally unsatisfactory” - the theoretical content of the course has been partially mastered, the necessary practical skills have not been formed, most of the training tasks provided for by the training program have not been completed, or the quality of their implementation has been assessed with 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 implementation of educational tasks. |
| <b>F</b>  | “ Definitely unsatisfactory” - the theoretical content of the course has not been mastered, the necessary practical work skills have not been formed, all the completed training tasks contain gross errors, additional independent work on the course material will not lead to any significant improvement in the quality of the training tasks.                                                                                                                                                  |



# **Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools**

## **Set of tasks for calculation and graphic work, simulator training**

Task (assignment) 1 calculation of the possibility of discharging wastewater from the workshop into a flowing water body for household purposes without preliminary treatment

Task (assignment) 2 Calculation of the main parameters of the municipal solid waste landfill

Task (assignment) 3 Calculation of landfill gas emissions generated during the disposal of municipal solid waste

Task (assignment) 4 the choice of technology when creating a vegetation cover on disturbed lands is

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