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

Institute of Environmental Engineering

FINAL STATE EXAMINATION SYLLABUS

Recommended by the Didactic Council for the Education Field of:

05.04.06 "Ecology and Nature Management"

The final state examination is implemented within the professional education program of higher education:

«Integrated Solid Waste Management»

2025

1. FINAL STATE EXAMINATION GOAL AND TASKS

The goal of the final state examination within the framework of the higher education programme implementation is to check the conformity of the students' training outcomes as the programme results with the relevant requirements of the Federal State Educational Standard of the Higher Education or the RUDN University Educational Standards.

The tasks of the final state examination include the following:

- checking the quality of teaching a person basic humanitarian knowledge, natural science laws and phenomena necessary for professional activities of a graduate;
- identifying the level of theoretical and practical readiness of a graduate to perform professional tasks in compliance with the qualification obtained;
- establishing the degree of a person's desire for self-development, improving his or her qualifications and skills;
- exploring the formation of a graduate's sustainable motivation for professional activities in compliance with the types of tasks of professional activities provided for by the Federal State Educational Standard of the Higher Education or the RUDN University Educational Standards;
- assessing the level of graduates' ability to find organizational and managerial solutions in non-standard situations and evaluating graduates' readiness to bear responsibility for them;
- ensuring the integration of education and scientific and technical activities, increasing the efficiency of scientific and technological achievements use, reforming the scientific sphere and stimulating innovation;
- ensuring the quality of specialists' training in compliance with the requirements of the Federal State Educational Standards of the Higher Education or the RUDN University Educational Standards.

2. REQUIREMENTS FOR HIGHER EDUCATION PROGRAMME COMPLETION AND LEARNING OUTCOMES

A student who does not have failed tests or exams and who has fully completed the curriculum or the individual curriculum of the higher education programme is allowed to the final state examination.

On the higher education programme completion the graduate is expected to master the following **generic competences** (GC):

Code and name of the competence
GC-1 Able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy.
GC-2 Able to manage a project at all stages of its life cycle.
GC-3. Able to organize and manage the work of the team, developing a team strategy to achieve the goal.
GC-4. Able to apply modern communication technologies, including in a foreign language(s) for academic and professional interaction
GC-5. Able to analyze and take into account the diversity of cultures in the process of intercultural interaction.
GC-6. Able to identify and implement the priorities of their own activities and ways to improve it based on self-assessment.
GC-7. Able to use digital technologies and methods of searching, processing, analyzing, storing

Code and name of the competence
and presenting information (in the field of Ecology and nature management) in the digital economy and modern corporate information culture.

- **general professional competencies** (GPC):

Code and name of the competence
GPC-1. Able to use philosophical concepts and methodology of scientific knowledge in the study of various levels of organization of matter, space and time.
GPC-2. Able to use special and new sections of ecology, geoecology and nature management in solving research and applied problems of professional activity.
GPC-3. Able to apply environmental research methods to solve research and applied problems of professional activity.
GPC-4. Able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management.
GPC-5. Able to solve the problems of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies.
GPC-6 Able to design, represent, protect and disseminate the results of their professional activities, including research.

- **professional competencies** (PC):

PC code and name of the competence
PC-1 Able to organize and manage the activities of the enterprise using in-depth knowledge in the field of environmental management
PC-2 Able to develop and economically justify plans for the introduction of new equipment and technologies to ensure minimal impact of waste on the environment
PC-3 Able to develop measures for the economic regulation of the environmental activities of the organization
PC-4 Capable of assessing the impact of economic activities on the environment
PC-5 Able to analyze the causes and minimize the consequences of the negative impact of production on the environment
PC-6 Able to coordinate activities for the organization and control in the field of production and consumption waste management
PC-8 Possesses the skills of preparing thematic maps and plans, analytical information on engineering and environmental surveys
PC-9 Able to carry out a full-scale examination of an object, its parts, foundation or environment and has the skills of desk processing and formalization of research results
PC-10 Capable of monitoring the state of the environment using environmental technologies
PC-11 Able to determine the structure and master the methods of zoning the assessed territory according to the types of anthropogenic load and environmental components
PC-12 Able to use modern means of geographic information systems and information and communication technologies in professional activities
PC-13 Capable of conducting spatial, territorial, demographic, sociological, economic research, engineering-geological, cartographic surveys

3. FINAL STATE EXAMINATION PROCEDURE

The final state examination can be conducted both in in-person format (students and the state examination committee are at RUDN University during the examination), and through the use of distance learning technologies (DLT) available in the RUDN Electronic Information and Educational Environment.

The procedure for in-person or DLT-facilitated final state examination is regulated by the relevant local normative act of the RUDN University.

The final state examination within the framework of the higher education programme includes:

- state exam
- defence of the graduation qualifying paper (degree thesis). It can be conducted both in full-time format, and using distance learning technologies.

4. STATE EXAM PROCEDURE

The total workload of the State Exam is 6 credits.

The state exam is held in one or more disciplines and (modules) of the higher education programme, whose mastery bears a decisive importance for graduates' occupational performance.

The state exam is held in two stages:

The first stage includes the assessment of the level of a graduate's theoretical training in the form **of computer testing** through the tools available in the RUDN Electronic Information and Educational Environment (EIEE).

The second stage focuses on the assessment of the graduate's practical preparation for future occupational activities in the form **of solving work-related situational problems (cases)**.

In order to prepare students for taking the state exam, the head of the educational programme (no later than one calendar month before the start of the final state examination) shall familiarise the graduate students with the final state examination syllabus, the comprehensive list of theoretical issues included in the state exam, examples of work-related (occupational) situational tasks (cases) that the students will have to solve in the process of taking the state exam, as well as with the procedure for each stage of the state exam and the grading system for evaluating its results (with assessment materials).

Before the state exam, students are offered consultations on issues and tasks included in the state exam (mandatory pre-exam consultation).

The state exam results evaluation is carried out in accordance with the methodology set forth in the assessment toolkit that is specified in the Appendix to this syllabus.

5. REQUIREMENTS FOR GRADUATION QUALIFYING PAPER (DEGREE THESIS) AND PROCEDURE FOR ITS DEFENCE

The degree thesis is a graduation qualifying paper that the student (several students in a team) prepare to demonstrate his/her/their level of competence and work readiness.

The list of degree thesis themes offered to students for further work is approved by the order of the head of the educational division (faculty/institute/academy) that runs the higher

education programme, the respective information is delivered to the students by the programme head no later than six months before the date of the final state examination start.

The students are allowed to suggest their own themes for the theses, under the set procedure.

The student who has passed the state exam is admitted to defend the graduation degree thesis.

The student (students) is/are allowed to defend his/ her/their thesis only if this fully completed degree paper is signed by the respective graduate (s), the supervisor, the consultant (if any), the heads of the educational department and educational division; the thesis is also subject to the external review procedure (mandatory for master's and specialist's programmes) and the plagiarism check (in the "Antiplagiarism" system). The review of the graduation qualifying paper supervisor shall be attached as well, with a specific emphasis laid on the graduate's activities in the course of the degree thesis drafting.

No later than 14 days before the date of the thesis defense, a rehearsal of the procedure is held at the presence of the degree thesis supervisor and other academic staff of the educational department, in order to timely identify and eliminate shortcomings in the structure, content and design of the degree thesis.

The degree theses are introduced to the State Examination Board members at the public defense procedure. It includes the students' oral reports with mandatory multimedia (graphic) presentations that introduce the thesis main content.

At the end of the reports, the students reply orally to the State Examination Board members' questions regarding the subject, structure, content of the paper and the profile/ specialization of the higher education programme. The reports and / or answers to the Board members' questions may be delivered in a foreign language.

The stages of the graduation qualifying paper preparation, the requirements for its structure, volume, contents and design, as well as the list of mandatory and recommended documents submitted for defense are specified in the relevant guidelines.

The evaluation of the degree thesis defense results is carried out in accordance with the methodology set forth in the assessment toolkit that is specified in the Appendix to the syllabus.

6. REQUIREMENTS FOR EQUIPMENT AND TECHNOLOGY SUPPORT FOR FINAL STATE EXAMINATION

To prepare for the final state examination, students can use the educational portal of RUDN.

7. RESOURCES RECOMMENDED FOR FINAL STATE EXAMINATION

The main reading :

1. Eric D. Kolaczyk. Statistical Analysis of Network Data: Monograph / D.K. Eric. : Springer New York, 2009. Режим доступа: http://www.springerlink.com/openurl.asp?genre=book&isbn=978-90-481-3099-3
2. Kharlamova M.D. Kurbatova A.I. Modern Technologies of Waste Managment, Recycling and Environmental Protection M. : Publishing House of RUDN University, 2017. - 98 p.
3. Evans Virginia. Evans, J. Dooley, K. Rodgers. Environmental Engineering Book 1, 2, 3 / V. Newbery : Express Publishing, 2013. - 38, 40, 41 p
4. Burkhard, B., & Maes, J. (2017). Mapping ecosystem services. Advanced books, 1, e12837. Режим доступа: https://ab.pensoft.net/articles.php?id=12837

5. Ekins, P., Domenech, T., Drummond, P., Bleischwitz, R., Hughes, N., & Lotti, L. (2019, July). The Circular Economy: What, Why, How and Where. In Background paper for an OECD/EC Workshop on (Vol. 5). https://www.oecd.org/cfe/regionaldevelopment/Ekins-2019-Circular-Economy-What-Why-How-Where.pdf
6. EU Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf
7. GC Guidance Environmental Impact Assessment Explains requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017. https://www.gov.GC/guidance/environmental-impact-assessment
8. IFC Environmental and social impact assessment guidelines https://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Hydro+Advisory/Resources/Tools+and+Guidelines/
9. EBRD Environmental and social impact assessments https://www.ebrd.com/work-withus/project-finance/environmental-and-social-impact-assessments.html
10. The Ellen MacArthur Foundation's report «Towards the circular economy. Economic and business rationale for an accelerated transition», 2013 Vol. 1.- 91 pp.
11. The report of Material Economics. The Circular Economy – a Powerful Force for Climate Mitigation, 2018, 176 pp.
12. Neugarten, R.A., Langhammer, P.F., Osipova, E., Bagstad, K.J., Bhagabati, N., Butchart, S.H.M., Dudley, N., Elliott, V., Gerber, L.R., Gutierrez Arrellano, C., Ivanić, K.-Z., Kettunen,
M., Mandle, L., Merriman, J.C., Mulligan, M., Peh, K.S.-H., Raudsepp-Hearne, C., Semmens, D.J., Stolton, S., Willcock, S. (2018). Tools for measuring, modelling, and valuing ecosystem services: Guidance for Key Biodiversity Areas, natural World Heritage Sites, and protected areas. Gland, Switzerland: IUCN. x + 70pp.

Additional reading:

1. Ecosystem Management: adaptive, community-based conservation / by Gary K. Meffe ... [et al.] Island Press.- 2002.- 333 p.
2. Burrows John P. The Remote Sensing of Tropospheric Composition from Space 2011. (Physics of Earth and Space Environments, ISSN 1610-1677
http://www.springerlink.com/openurl.asp?genre=book&isbn=978-3-642-14790-6
ISBN 978-3-642-14790-6.
3. Mishchenko Michael I. Polarimetric Detection, Characterization and Remote Sensing: Proceedings / M.I. Mishchenko, Y.S. Yatskiv. - 2011. - (NATO Science for Peace and Security Series C: Environmental Security

Resources of the information and telecommunications network "Internet":

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
- 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/
- Google search engine https://www.google.ru/
- abstract database SCOPUS http:// www .elsevierscience.ru/ products / scopus /

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF GRADUATES' COMPETENCES LEVEL

DEVELOPER:

Associate Professor of the ES&PQM Department		**Popkova A.V.**
Position	Signature	Name, Surname

HEAD OF DEPARTMENT:

Director of ES&PQM Department		**Savenkova E.V.**
Position	Signature	Name, Surname

HEAD OF EP HE:

Associate Professor of the EM Department		**Kapralova D.O.**
Position	Signature	Name, Surname