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**Federal State Autonomous Educational Institution of Higher Education
Peoples' Friendship University of Russia named after Patrice Lumumba
RUDN University**

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

FINAL STATE EXAMINATION SYLLABUS

Recommended by the Didactic Council for the Education Field of:

field of studies / speciality code and title

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

Integrated Solid Waste Management
higher education programme profile/specialisation title

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 descriptor of the generic competences
GC-1 Able to carry out a critical analysis of problem situations based on a systems approach and to develop a strategy for action.
GC -2 Able to manage a project at all stages of its life cycle.
GC -3 Able to organize and lead the work of a team, developing a team strategy to achieve the set goal.
GC -4 Able to apply modern communication technologies in the state language of the Russian Federation and foreign language(s) for academic and professional interaction.
GC -5 Able to analyze and account for cultural diversity in the process of intercultural interaction.
GC -6 Able to determine and implement priorities of one's own activities and ways to improve them based on self-assessment.
GC -7 Able to use basic knowledge in the field of information culture.

- general professional competences (GPC):

Code and descriptor of the general professional competences
GPC-1 Able to use philosophical concepts and the methodology of scientific knowledge when studying various levels of organization of matter, space, and time.
GPC-2 Able to use specialized and emerging branches of ecology, geocology, and natural resource management when solving research and applied tasks in professional activities
GPC-3 Able to apply ecological research methods to solve research and applied tasks in professional activities.
GPC-4 Able to apply regulatory legal acts in the field of ecology and natural resource management, as well as norms of professional ethics.
GPC-5 Able to solve professional tasks in the fields of ecology, natural resource management, and environmental protection using information and communication technologies, including geographic information systems (GIS).
GPC-6 Able to design, present, defend, and disseminate the results of one's professional activities, including research activities.

- professional competences (PC):

Code and descriptor of the professional competences
PC-1 The ability to formulate problems, objectives, and methods of scientific research; to obtain new reliable facts based on observations, experiments, and scientific analysis of empirical data; to summarize scientific works; to compile analytical reviews of accumulated knowledge in global science and industrial activities; to generalize obtained results in the context of previously accumulated scientific knowledge; and to formulate conclusions and practical recommendations based on representative and original research results.
PC -2 The ability to creatively apply knowledge of fundamental and applied sections of special disciplines within the Master's program in scientific and production-technological activities.
PC-3 Possession of the fundamentals of design, expert-analytical activities, and performance of research using modern approaches and methods, equipment, and computing systems.
PC-4 The ability to use modern methods of processing and interpreting environmental information when conducting scientific and industrial research.
PC-5 The ability to develop standard environmental protection measures and to conduct an environmental impact assessment of planned structures or other forms of economic activity.
PC-6 The ability to diagnose problems of nature protection, to develop practical recommendations for its conservation and for ensuring sustainable development.
PC-8 Possesses the skills of preparing thematic maps and plans, as well as analytical information based on engineering-ecological surveys
PC-9 Able to conduct a field survey of an object, its parts, foundation, or surrounding environment, and possesses skills in office processing and formalization of research results.
PC-10. Able to conduct environmental monitoring using environmental protection technologies.
PC-11. Able to determine the structure and possesses methods for zoning the assessed territory by types of anthropogenic load and environmental components
PC-12 Able to use modern Geographic Information System tools and information and communication technologies in professional activities
PC-13 Able to carry out spatial, territorial, demographic, sociological, and economic studies, as well as engineering-geological and 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 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).

4. STATE EXAM PROCEDURE

The total workload of the State Exam is 3 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 procedure for conducting the computer testing within the final state examination is as follows:

- 1) The student arrives at the computer lab at the appointed time;
- 2) They are given a 50-question test.....

The procedure for conducting the second stage of the state exam is as follows:

- 1) The student arrives for the exam at the appointed time and takes a question paper;
- 2) Prepares for and answers the questions in writing.

.....

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.

[\(The state exam procedure is not included in the final state examination\).](#)

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 theses 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 *(if there is a state exam in the final state examination procedure)*.

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 "Anti-plagiarism" 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 defence, 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 defence 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/specialisation 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 defence 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.

(The procedure of the graduation qualifying paper (degree thesis) defence is not included in the final state examination).

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

The infrastructure and technical support necessary for the examination implementation include: classrooms equipped with... (computers, specialised software, other devices, if any, etc.).

7. RESOURCES RECOMMENDED FOR FINAL STATE EXAMINATION

Main readings to prepare for the state exam and/or degree thesis defence:

1 Dr Michael J de Smith Statistical Analysis Handbook A Comprehensive Handbook of Statistical Concepts, Techniques and Software Tools 2018-2024 Edition. Issue version:

2024-1 Published by: The Winchelsea Press, UK Режим доступа: <https://www.statsref.com/StatsRefSample.pdf>

2 A Wealth from Waste Approach J.P.N. Rai, Shweta Saraswat. Green Technologies for Waste Management, CRC Press, 2023, 405p

3 Sadhan Kumar Ghosh Waste Management as Economic Industry Towards Circular Economy, Springer, 2020, 210p <https://link.springer.com/book/10.1007/978-981-15-1620-7>

4 Ramesha Chandrappa · Diganta Bhusan Das Solid Waste Management Principles and Practice. Second Edition, Springer 2024, 876 p

5 Second Edition Evans Virginia. Evans, J. Dooley, K. Rodgers. Environmental Engineering Book 1, 2,

3 / V. Newbery : Express Publishing, 2013 - 38, 40, 41 p

6 Burkhard, B., & Maes, J. (2017). Mapping ecosystem services. Advanced books, 1, e12837. Режим доступа: <https://ab.pensoft.net/articles.php?id=12837>

7 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>

8 Vijay Prakash Gupta, A. K. Haghi, Shebin Sharief Green Economy and Sustainable Development, Springer, 2025 364p <https://link.springer.com/book/10.1007/978-3-031-92636-5>

9 Walter R. Stahel The Circular Economy: A User's Guide by Walter R. Stahel 2025—eBook Details <https://oceanofpdf.com/authors/walter-r-stahel/pdf-epub-the-circular-economy-a-users-guide-download/>

10 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

11 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>

12 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/

13 EBRD Environmental and social impact assessments <https://www.ebrd.com/workwithus/project-finance/environmental-and-social-impact-assessments.html>

14 Waste Treatment in the Biotechnology, Agricultural and Food Industries Lawrence K. Wang Mu-Hao Sung Wang, Yung-Tse Hung Volume 1, Springer . 2022, 494 p

15 Jindong Li Satellite Remote Sensing Technologies Springer, <https://doi.org/10.1007/978-981-15-4871-0> <http://www.springer.com/series/16385>

16 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

17 Liora, N.; Poupkou, A.; Papadogiannaki, S.; Parliari, D.; Giama, E.; Pieretti, G.A.; Da Rugna, L.; Susanetti, L.; Bressan, M.; Villanueva, J.A.B.; et al. A Methodology for Carbon

Footprint Estimations of Research Project Activities—A Scenarios Analysis for Reducing Carbon Footprint. Atmosphere 2023, 14, 6 [https:// doi.org/10.3390/atmos14010006](https://doi.org/10.3390/atmos14010006)

Additional readings to prepare for the state exam and/or degree thesis defence:

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

4 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>

5 The Ellen MacArthur Foundation's report «Towards the circular economy. Economic and business rationale for an accelerated transition», 2013 Vol. 1.- 91 pp.

6 The report of Material Economics. The Circular Economy – a Powerful Force for Climate Mitigation, 2018, 176 pp.

Internet sources

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:

- RUDN Electronic Library System (RUDN ELS) <http://lib.rudn.ru/MegaPro/Web>

- EL "University Library Online" <http://www.biblioclub.ru>

- EL "Yurayt" <http://www.biblio-online.ru>

- EL "Student Consultant" www.studentlibrary.ru

- EL "Lan" <http://e.lanbook.com/>

- EL "Trinity Bridge"

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2. Databases and search engines:

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

- Yandex search engine [https:// www.yandex.ru/](https://www.yandex.ru/)

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

- Scopus abstract database

<http://www.elsevierscience.ru/products/scopus/>

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The training toolkit and guidelines for student's self-studies to prepare for the state exam and /or to draft the degree thesis and defend it:*

1. The guidelines for drafting and formatting the degree thesis within the higher education programme _____

2. The procedure for the degree thesis check in the "Anti- plagiarism" system.

3. The procedure for conducting the final state examination under the higher education programme _____ through the use of DLT and proctoring system.

4.

*The training toolkit and guidelines for the student's self-studies are placed on the final state examination page in the university telecommunication training and information system under the set procedure.

DEVELOPER:

Associate Professor of the NM
Department

Kapralova D.O.

Position
HEAD OF DEPARTMENT:

Signature

Name,
Surname

Director of the NM department

Kucher D.E.

Position
HEAD OF PROGRAMME:

Signature

Name, Surname

Associate Professor of the
NM Department

Kapralova D.O.

Position

Signature

Name, Surname