Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA NAMED AFTER PATRICE LUMUMBA
RUDN University

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

FINAL STATE EXAMINATION SYLLABUS

Recommended by the Didactic Council for the Education Field of:

08.04.01 Construction
field of studies / speciality code and title

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

Civil Engineering and Built Environment
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 EDGCATION 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 critically analyze problem situations on the basis of a systematic approach, to develop a strategy of action
GC-2 Able to manage the project at all stages of its life cycle
GC-3 Able to organize and lead a team, developing a team strategy to achieve the goal
GC-4 Able to use 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 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 them on the basis of self-assessment
GC-7 Able: to search for the necessary sources of information and data, perceive, analyze, remember and transmit information using digital means, as well as using algorithms when working with data received from various sources to effectively use the information to solve problems ; to assess information, its reliability, to build logical conclusions on the basis of incoming information and data

-general professional competencies (GPC):

Code and descriptor of the general professional competences
GPC-1 Able to solve problems of professional activity on the basis of theoretical and practical foundations, the mathematical apparatus of the fundamental sciences
GPC-2 Able to analyze, critically comprehend and present information, search for scientific and technical information, acquire new knowledge, including with the help of information technology
GPC-3 Able to set and solve scientific and technical problems in the field of construction, construction industry and housing and communal services on the basis of knowledge of industry problems and experience in their solution
GPC-4 Able to use and develop project and administrative documentation, as well as participate in the development of normative legal acts in the field of construction and housing and communal services
GPC-5 Able to conduct and organize design and survey work in the field of construction, housing and communal services, carry out technical expertise of projects and designer's supervision of their compliance
GPC-6 Able to carry out research of objects and processes in the field of construction and housing and communal services
GPC-7 Able to manage an organization operating in the construction industry and housing and communal services, to organize and optimize its production activities

- Professional competencies (PC):

Code and descriptor of the professional competences
PC-1 Conducting scientific research in the field of construction
PC-2 Development of project products based on the results of engineering and technical design for urban development activities
PC-3 Organizational, technical and technological preparation of construction production
PC-4 Organizational and pedagogical support of students
PC-5 Organization of construction works at the capital construction facility

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).

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 in the form **of computer testing**.

The second stage - the main part.

The purpose of the test part of the state exam is to assess the level of theoretical training of a graduate based on the material of the disciplines of the modules of the educational program. The test task contains 20 questions. The student has 40 minutes to complete the test task.

The main part of the state examination is conducted in writing using examination cards. Each exam card contains four questions and a task.

The questions and tasks included in the examination ticket are interdisciplinary in nature and are aimed at determining the level of theoretical and practical readiness of a graduate to solve professional problems defined by the educational standard of RUDN University in accordance with the type / types of professional activity to which the educational program is oriented.

The total number of examination tickets is determined by the number of students admitted to the state examination. The student is given 90 minutes to prepare and defend a written response to the ticket.

At the state exam, members of the state examination commission may ask the student additional questions in the field of the graduate's professional activity, provided for by the educational standard.

In order to prepare students for passing the state exam, the head of the education programme (no later than one calendar month before the start of the state exam) is obliged to familiarize the graduate students with this state exam program, an exhaustive list of questions included in the test part of the state exam, as well as with the procedure for conducting each of the stages of the state exam and the methodology evaluation of its results (with evaluation materials).

Before the test part of the state exam, students are required to be consulted on issues and tasks included in the test part of the state exam program (pre-examination 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 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.

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 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.

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

To prepare for the state exam and defense of the degree theses, students use the premises for independent work.

To conduct the test part of the state exam, a classroom is required, equipped with workplaces with personal computers (at least 12), equipped with the necessary software and connected to the Internet.

To conduct the main part of the state exam and defense of the degree theses for members of the state examination commission, it is necessary to have a room with a capacity of 12 people, in which workplaces are equipped for all members of the examination commission, with the ability to listen to reports, view public presentations of speakers, keep notes and protocols, there are places for listeners who wish to attend the degree theses defense procedure. The necessary room equipment includes:

- Equipment for public presentations for members of the state examination commission results, including a multimedia screen, a projector, and audio equipment.
- board for illustrating answers to questions;
- tablets/stands of not less than A1 format (if necessary) to place the graphic part of the degree theses on them.

The student can notify the issuing department in writing about the wishes for additional material and technical equipment (if necessary) of the audience assigned to defend the degree theses, no later than a week before the defense procedure.

7. RESOURCES RECOMMENDED FOR FINAL STATE EXAMINATION

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

1. Yudina, AF Metal and reinforced concrete structures. Montage: textbook for universities / A. F. Yudina. — 2nd ed., corrected. and additional - Moscow: Yurayt Publishing House, 2019. - 302 p. - (Series: Specialist). - ISBN 978-5-534-06927-3. - Text: electronic // EBS Yurayt [website]. — URL: https://biblio-online.ru/bcode/434494 (date of access: 04/01/2019).

2. Krivoshapko, S. N. Architectural and building structures textbook for academic undergraduate studies / S. N. Krivoshapko, V. V. Galishnikova. - Moscow: Yurayt Publishing House, 2019. - 460 p. - (Series: Bachelor. Academic course). — ISBN 978-5-534-03143-0. — Access mode: HYPERLINK https:/^iblio-online.ru/bcode/432798

3. Tukhfatullin, B. A. Numerical methods for calculating building structures. Finite element method: study guide for academic undergraduate students / B. A. Tukhfatullin. — 2nd ed., corrected. and additional - Moscow: Yurayt Publishing House, 2019. - 157 p. - (Series: Bachelor. Academic course). - ISBN 978-5-534-08899-1. - Access mode: HYPERLINK https://biblio-online.ru/bcode/442338

4. Vdovin, V. M. Structures made of wood and plastics. Glued board and glued plywood constructions: textbook, manual for SPO / V. M. Vdovin. — 2nd ed., corrected. and additional - Moscow: Yurayt Publishing House, 2019. - 211 p. — (Series: Vocational education). - ISBN 978-5-534-07012-5. — Access mode: HYPERLINK https: biblio-online.ru bcode/442214

5. Pimenov V.G. Numerical methods in 2 hours. Publishing house Yurayt, 2017. 111 p.

6. Kumpyak O.G. etc. Reinforced concrete and stone structures. Textbook. Moscow: DIA publishing house, 2014.-672 p.

7. Rynkovskaya M.I. Dynamics of elastic systems: lecture notes / M.I. Rynkovska; Moscow: RUDN University, 2017. - 67 p.: ill.

8. Maklakova T.G., Nanasova S.M. Constructions of civil buildings: Textbook. - M.: DIA publishing house, 2009.-296 with

9. I.A. Shereshevsky. Construction of civil buildings; Textbook - M .: "Architecture - C", 2010 - 176s.

10. Architectural structures / Z.A. Kazbek-Kaziev, V.V. Bespalov, Yu.A., Dykhovichny et al., edited by Z.A. Kazbek-Kazieva: Textbook. - M .: "Architecture - C", 2009 - 344s.

11. Yu.A. Dykhovichny idr. Architectural structures of multi-storey buildings / Yu.A., Dykhovichny, Z.A. Kazbek-Kazievidr.: Textbook. - M.: "Architecture - C", 2009 -248s.

12. Potasheva, G. A. Project management (project management) [Electronic resource]: study guide / G.A. Potasheva. — M.: INFRA-M, 2018. — 224 p.// ZNANIUM.COM: electronic library system. - Access mode: http://www.znanium.com/catalog.php, restricted. - Zagl. From the screen.

13. Project management: textbook and workshop for universities / A. I. Balashov, E. M. Rogova, M. V. Tikhonova, E. A. Tkachenko; under the general editorship of E. M. Rogova. - Moscow: Yurayt Publishing House, 2020. - 383 p.

14. Mikhailov, V. V. Spatial bar structures of coatings (structures) studies, manual / V. V. Mikhailov, M. S. Sergeev; Vladim. state un-t. - Vladimir: Publishing House in Vladimir. state un-ta, 2011. - 56 p. ISBN 978-5-9984-0159-6

15. Belov V.V., Building materials [Electronic resource] / Belov V.V., Petropavlovskaya V.B., Khramtsov N.V. - M. : DIA Publishing House, 2016. - 270 p. - ISBN 978-5-93093-965-1 - Access mode: http://www.studentlibrarv.ru/book/ISBN9785930939651 .html

16. Mikulsky V.G., Building materials (Materials science. Technology of construction materials) [Electronic resource]: Educational edition / Mikulsky V.G., Sakharov G.P. - M. : DIA Publishing House, 2011. - 520 p. - ISBN 978-5-93093-041-2 - Access mode: http://www.studentlibrarv.ru/book/ISBN9785930930412.html

17. Dvorkin L.I., Building mineral binding materials [Electronic resource] / Dvorkin L.I. , Dvorkin O.L. - M.: Infra-Engineering, 2011. -544 p. - ISBN 978-5-9729-0035-0 - Access mode: http://www.studentlibrary.ru/book/ISBN9785972900350.html

18. Popov K.N. Caddo M.B. Building materials and products. Revised edition. and additional - M.: Higher school, 2006-439s.

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

19. Krivoshapko, S. N. Structures of buildings and structures: a textbook for SPO / S. N. Krivoshapko, V. V. Galishnikova. - Moscow: Yurayt Publishing House, 2019. - 476 p. — (Series: Vocational education). — ISBN 978-5-534-02348-0. — Access mode: HYPERLINK https://biblio-online.ru/bcode/433396

20. Dedyukh, R.I. Material science and technology of structural materials. Fusion welding technology: textbook, manual for applied bachelor's degree / R. I. Dedyukh. Москва : Издательство Юрайт, 2019. — 169 с. — (Серия : Университеты России). — ISBN 978-5-534-01539-3. — Текст : электронный // ЭБС Юрайт [сайт]. — URL: https://biblio-online.ru/bcode/433979 (дата обращения: 01.04.2019).

21. Yudina, A.F. Building structures. Montage: textbook for SPO / A. F. Yudina. 2nd ed., rev. and additional - Moscow: Yurayt Publishing House, 2019. - 302 p. — (Series: Vocational education). - ISBN 978-5-534-07027-9. — HYPERLINK access mode https://biblio-online.ru/bcode/442133

22. Vardanyan G.S., Andreev V.I., Atarov N.M., Gorshkov A.A. Strength of materials with the foundations of the theory of elasticity and plasticity. M.: Infra-M, 2010.

23. Krivoshapko, S.N. Strength of materials. Textbook and workshop / S.N. Krivoshapko. M.: "Higher School", 2019. - 398 p.

24. Gerasimov, A.I. Designing a comfortable living environment in the premises of residential buildings from the position of physical and technical parameters of enclosing structures: monograph / A.I. Gerasimov, I.P. Saltykov. - Moscow ; Berlin: Direct-Media, 2019. - 176 p. : ill., tab. - Bibliography. in book. - ISBN 978-5-4475-9786-3; The same [Electronic resource]. -URL: http://biblioclub.ru/index.php?page=book&id=496800.

25. Darkov A.V., Shpiro G.S. Strength of materials. - M .: "Higher School", 1975. - Ed. 4th. - 654 p.

26. Kopnov V.A., Ivanov V.N. Solving problems on the strength of materials. - M.: Publishing House of RUDN University, 1992.-36 p.

27. Babakov I.M. Theory of Oscillations: textbook, manual / I.M. Babakov. - 4th ed., Rev. - M.: Bustard, 2004. - 591, [1] p.: 12 ill., 15 tab. - (Classics of Russian science).

28. Gandzhuntsev, M. I. Fundamentals of dynamics and stability of rod systems: study guide / M. I. Gandzhuntsev, A. A. Petrakov. - M.: MGSU, 2012. - 96 p. - ISBN 978-5-7264-0658-9.

29. Barabash M. S., Laznyuk M. V., Martynova M. L., Presnyakov N. I. Modern technologies for calculating and designing metal and wooden structures. Course and diploma design. Research tasks: textbook. allowance: rec. UMO. - M.: DIA, 2010 -326 p.

30. Gorev V.V. Metal structures in Zt. T.2. Building structures: textbooks, for builders, universities / V.V. Gorev, B.Yu. Uvarov, V.V. Filippov, G.I. White and others; ed. V.V. Woe-va. Moscow: Higher school, 2004. 528 p.

31. Metal constructions. Special course: textbook for universities / E.I. Belenya, N.N. Streletsky, G.S. Vedennikov and others; ed. E.I. Belenya-Ze aud., M. : Stroyiz-dat, 1991. 687 p.

32. Gorbunov G.I. Fundamentals of building materials science. DIA. M.2002

33. V.G. Batrakov. modified concrete. Theory and practice. 2nd ed. revised and additional - M.: 1998. - 768s.

34. Gypsum materials and products (production and application). Directory. Under the general editorship. A.V. Ferronskaya - M .: Publishing House of ASV, 2004. - 488s.

35. Assessment of the quality of building materials. Tutorial. K.N. Popov, M.B. Caddo, O.V. Kulkov - M .: Publishing House of ASV, 1999. - 240s.

36. Material science and technology of structural materials. Textbook for high schools. Yu.P. Solntsev, V.A. Veselov, V.P. Demyantsevich and others - 2nd ed. - M.: MISIS, 1996.-576s.

37. Technology of concrete aggregates. Textbook for builds, universities on special. "Manufacture of building products and structures". CM. Itskovich, L.D. Chumakov, Yu.M. Bazhenov. -M.: Higher. school, 1991. -272p.

38. Durability of building structures and structures made of composite materials. V.Sh. Barbakadze, V.V. Kozlov, V.G. Mikulsky, I.I. Nikolov. Ed. V.G. Mikulsky. - M.: Stroyizdat, 1993. - 256 p.

Internet sources

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

- RUDN Electronic Library System (RUDN ELS) http://lib.rudn.ru/MegaPro/Web
- EL "University Library Online" http://www.biblioclub.ru
- EL "Yurayt" http://www.biblio-online.ru
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" http://e.lanbook.com/
- EL "Trinity Bridge"

2.*Databases and search engines:*

- electronic foundation of legal and normative-technical documentation http://docs.cntd.ru/
- Yandex search engine https:// www .yandex.ru/
- Google search engine https://www.google.ru/
- Scopus abstract database http://www.elsevierscience.ru/products/scopus/

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

*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.

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

The assessment materials and the grading system* to evaluate the graduate's level of competences (competences in part) formation as the results of the higher education programme completion are specified in the Appendix to this syllabus.

* The assessment materials and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

HEAD
OF HIGHER EDUCATION PROGRAMME:

Associate professor of the Department of Construction Technology and Structural Materials		M.I. Rynkovskaya
position, department	signature	name and surname