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**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

**INTERNSHIP SYLLABUS**

**Independent Research Work**

internship title

**Advanced field internship**

internship type

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

**08.04.01 Civil Engineering**

field of studies / speciality code and title

**The student's internship is implemented within the professional education programme of higher education:**

**Civil Engineering and Built Environment**

higher education programme profile/specialisation title

## 1. INTERNSHIP GOAL(s)

The goal of the Internship is to deepen, systematize and consolidate theoretical knowledge, as well as to acquire the skills and abilities in carrying out scientific research necessary for writing a master's thesis, including the formation and development of practical skills and competencies of the master, the acquisition of experience in independent professional activity.

The main objectives of the Internship are:

- to study scientific and technical information, and domestic and foreign experience on the topic of research work;
- learn to set scientific and technical problems, choose methodological methods and means of solving them, and process data for writing a master's thesis;
- master the skills and basic techniques for setting up and conducting experiments, collecting and analyzing results, identifying theory and experiment.

## 2. REQUIREMENTS FOR LEARNING OUTCOMES

The internship implementation is aimed at the development of the following competences (competences in part):

<b>Competence code</b>	<b>Competence descriptor</b>	<b>Competence formation indicators (within this course)</b>
GC-1	Able to critically analyze problem situations on the basis of a systematic approach, to develop a strategy of action	GC-1.1 Analyzes the problem, identifying its basic components; GC-1.2 Identifies and ranks the information required to solve the task; GC-1.3 Selects ways to solve the problem, analyzes the possible consequences of their use
GC-2	Able to manage the project at all stages of its life cycle	GC-2.1 Formulates the goals and objectives of the project, determines the expected results; GC-2.2 Within the scope of the tasks, identifies the available resources and limitations; GC-2.3 Develops a project implementation schedule; GC-2.4 Monitors the progress of the project, adjusts the schedule in accordance with the results of the control, evaluates the performance of the project
GC-3	Able to organize and lead a team, developing a team strategy to achieve the goal	GC-3.1 Knows how to organize teamwork, develop a strategy to achieve the goal; GC-3.2 Able to monitor the progress of teamwork and adjust its work for the effective achievement of goals
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-4.3 Able to present materials of academic and professional activities at public events
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-6.1 Analyzes tasks, projects, and their goals. Defines its resources and their limits (personal, situational, temporary, etc.) for the successful completion of the task; GC-6.2 Prioritize and choose the appropriate tools and methods for achieving goals and managing time
GC-7	Able: to search for the necessary sources of information and data,	GC-7.1 Searches for relevant sources of information and data, perceives, analyzes, remembers and transmits

	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	information using digital tools and algorithms when working with data from various sources in order to effectively use the information to solve problems; GC-7.2 Evaluates information, its reliability, builds logical conclusions on the basis of incoming information and data
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-1.1 Selects a mathematical model suitable for the professional problem to be solved, sets the required parameters and boundary conditions; GPC-1.2 Solves mathematical modeling problems using suitable analytical, numerical, or numerical-analytical methods; GPC-1.3 Solves professional problems using modern software systems for mathematical, digital modeling of structures
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-2.1 Able to search for scientific and technical information, including with the help of information technology; GPC-2.2 Able to analyze, critically comprehend information, acquire new knowledge; GPC-2.3 Able to present found and meaningful information, 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-3.1 Able to formulate and solve scientific and technical tasks in the field of building structures design; GPC-3.2 Able to set and solve scientific and technical tasks in the field of technology, organization, management of construction and operation of capital construction projects; GPC-3.3 Able to formulate and solve scientific and technical tasks in the field of engineering systems design
GPC-6	Able to carry out research of objects and processes in the field of construction and housing and communal services	GPC-6.1 Able to formulate goals, set research objectives, develop a research program; GPC-6.2 Able to choose appropriate research methods and carry out research according to the chosen methodology; GPC-6.3 Capable of processing, analyzing and drawing up research results; GPC-6.4 Able to present and defend the results of the research
PC-1	Conducting scientific research in the field of construction	PC-1.1 Able to carry out planning, preparation for research; PC-1.2 Able to carry out, control, receive research results; PC-1.3 Able to analyze and process research results; PC-1.4 Knows how to draw up, coordinate, and present the results of completed research

### 3. INTERNSHIP IN HIGHER EDUCATION PROGRAMME STRUCTURE

The Independent Research Work internship refers to the variable component of B2 block of the higher educational programme 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 internship.

*Table 3.1. The list of the higher education programme components that contribute to the achievement of the expected learning outcomes as the internship results.*

<b>Compe tence code</b>	<b>Competence descriptor</b>	<b>Previous courses / modules, internships</b>	<b>Subsequent courses / modules, internships</b>
GC-1	Able to critically analyze problem situations on the basis of a systematic approach, to develop a strategy of action	Problem solving techniques in Civil Engineering; Numerical methods for Civil Engineering; Mathematical Modelling; Geoinformation Systems and Applications; Independent Research Work (obtaining basic skills of research work)	Final State Examination
GC-2	Able to manage the project at all stages of its life cycle	Problem solving techniques in Civil Engineering; Project management; Life Cycle Economics of Buildings; BIM-Technology in Construction Management; Independent Research Work (obtaining basic skills of research work)	Final State Examination
GC-3	Able to organize and lead a team, developing a team strategy to achieve the goal	Problem solving techniques in Civil Engineering; Project management; Independent Research Work (obtaining basic skills of research work); Pedagogical Practice	Final State Examination
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	Professional Russian (as a Foreign Language); Problem solving techniques in Civil Engineering; Independent Research Work (obtaining basic skills of research work); Pedagogical Practice	Final State Examination
GC-6	Able to identify and implement the priorities of their own activities and ways to improve them on the basis of self-assessment	Problem solving techniques in Civil Engineering; Project management; Life Cycle Economics of Buildings; Independent Research Work (obtaining basic skills of	Final State Examination

		research work)	
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	Problem solving techniques in Civil Engineering; Digital technologies in construction; Geoinformation Systems and Applications; Life Cycle Economics of Buildings; BIM-Technology in Construction Management; Independent Research Work (obtaining basic skills of research work)	Final State Examination
GPC-1	Able to solve problems of professional activity on the basis of theoretical and practical foundations, the mathematical apparatus of the fundamental sciences	Numerical methods for Civil Engineering; Mathematical Modelling; Digital technologies in construction; Independent Research Work (obtaining basic skills of research work)	Final State Examination
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	Problem solving techniques in Civil Engineering; Independent Research Work (obtaining basic skills of research work)	Final State Examination
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	Mathematical Modelling; Digital technologies in construction; Project management; BIM-Technology in Construction Management; Independent Research Work (obtaining basic skills of research work)	Final State Examination
GPC-6	Able to carry out research of objects and processes in the field of construction and housing and communal services	Problem solving techniques in Civil Engineering; Numerical methods for Civil Engineering; Mathematical Modelling; Geoinformation Systems and Applications; Independent Research Work (obtaining basic skills of	Final State Examination

		research work)	
PC-1	Conducting scientific research in the field of construction	Problem solving techniques in Civil Engineering; Nanotechnology in Civil Engineering; Building materials: Special Topics; Sustainability in Civil Engineering; Geometric Shaping and Analysis of Shells; Independent Research Work (obtaining basic skills of research work)	Final State Examination

#### 4. INTERNSHIP WORKLOAD

The total workload of the internship Independent Research Work is 3 credits (108 academic hours).

#### 5. INTERNSHIP CONTENTS

*Table 5.1. Internship contents\**

Modules	Contents (topics, types of practical activities)	Workload, academic hours
Basic	Receiving an individual task for practice from the head	2
	Briefing on safety at the workplace (in the laboratory and / or in production)	2
	Collection and processing of information obtained from various sources (RUDN Library, Lenin Library, etc.)	24
	Preparation and conduct of experimental studies (if provided for by practice) in the laboratories of RUDN University or the organization in which the practice takes place	34
	Collection of analytical data in accordance with the individual task	24
	Analysis and processing of the obtained data	12
	Current control of the internship by the head	4
	Keeping an internship diary	2
Reporting	Preparation of a report on the internship	2
	Intermediate assessment (preparation for the defense and defense of the report)	2
<b>TOTAL:</b>		<b>108</b>

\* The contents of internship through modules and types of practical activities shall be FULLY reflected in the student's internship report.

#### 6. INTERNSHIP EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

The infrastructure and technical support necessary for the internship implementation include:

Laboratory of hydrological and technical safety of hydraulic structures.

Computer class. Multimedia. Interactive board.

Laboratory and research bench for water supply.

Laboratory and research stand for heating

Laboratory and research stand for ventilation.

A set of slides, control tests, scenarios for conducting classes using interactive forms of organizing the educational process, selecting tasks for current control. Computer class for 12 workplaces, equipped with a video projector and interactive whiteboard SMARTBoard 690;

Laboratory equipped with the following equipment: modernized HMS-50 tensile testing machine, GMS-20 tensile testing machine, PG-100 press, KMU-5 twisting machine, 2PG-2.5 press, TR-294 lever strain gauges, 3UKPA-5 Aistov device, calipers, deflectometer - indicators of movement of the pointer type, desktop drilling machine NS-12Az, printer HP LJ 1012W sch. Peleng-500 diaprector, HP Presario CQ61 laptop, demo models, and installations.

## **7. INTERNSHIP LOCATION AND TIMELINE**

The internship Independent Research Work can be carried out at the structural divisions of RUDN University (at Moscow-based organisations, as well as those located outside Moscow).

The internship at an external organisation (outside RUDN University) is legally arranged on the grounds of an appropriate agreement, which specifies the terms, place and conditions for an internship implementation at the organisation.

Main internship locations:

- laboratories of the Department of Civil Engineering;
- organizations (enterprises) for the construction, installation, repair and reconstruction of buildings, structures, their parts, and individual constructs (specialized organizations);
- research, design and development institutions and firms;
- firms for the production of building structures and products, the introduction of experimental materials and technologies for construction;
- construction laboratories, quality and certification centers, customer and supervision services, etc.

The student himself can come up with an initiative about the place of internship. The direction of the organization's professional activity offered to students for internship must correspond to the profile of the educational program and the types of professional activity for which the graduate of the program is preparing. The place of internship must be agreed with the head of the department, followed by (if the decision is positive) the conclusion of an appropriate agreement with the organization proposed by the student.

Students with disabilities and/or those who are classified as "disabled" undergo practical training, in an accessible form for them, in the laboratories of the university, as well as in specialized organizations with which relevant agreements have been concluded and which have the opportunity (equipment, special facilities, and infrastructure) for working with these categories of citizens.

The period of the internship, as a rule, corresponds to the period indicated in the training calendar of the higher education programme. However, the period of the internship can be rescheduled upon the agreement with the Department of Educational Policy and the Department for the Organization of Internship and Employment of RUDN students.

## **8. RESOURCES RECOMMENDED FOR INTERNSHIP**

*Main readings:*

1. Schreiber, K.A. Production technology of repair and construction works: monograph / K.A. Schreiber. - Moscow: ACB Publishing House, 2024. - 261 p. : illustrations, tables, schemes. -

Bibliography: p. 258 - ISBN 978-5-4323-0038-6; Access mode:<http://biblioclub.ru/index.php?page=book&id=312360>.

2. Shirshikov, B.F. Reconstruction of objects: (Organization of work. Limitations. Risks): monograph / B.F. Shirshikov, M.N. Ershov. - Moscow: ACB Publishing House, 2020. - 115 p. : tab., scheme., ill. - Bibliography. in book. - ISBN 978-5-93093-760-2; Access mode:<http://biblioclub.ru/index.php?page=book&id=273821>.

3. Mikhailov A.Yu., Technology and organization of construction. Workshop [Electronic resource]: Textbook / Mikhailov A.Yu. - M. : Infra-Engineering, 2018. - 196 p. - ISBN 978-5-9729-0140-1 - Access mode: <http://www.studentlibrary.ru/book/ISBN9785972901401.html>

*Additional readings:*

1. Komarov A.S., Construction technology of water supply and sanitation systems and facilities [Electronic resource ]: textbook / A.S. Komarov, O.A. Ruzhitskaya - M. : Publishing house MISI - MGSU, 2017. - 81 p. - ISBN 978-5-7264-1751-6 - Access mode: <http://www.studentlibrary.ru/book/ISBN9785726417516.html>

2. Ivanov E.S., Technology and organization of work in the construction of environmental and water management facilities [Electronic resource] / E.S. Ivanov - M.: DIA Publishing House, 2017. - 560 p. - ISBN 978-5-4323-0018-8 - Access mode: <http://www.studentlibrary.ru/book/ISBN9785432300188.html>

3. Revich Ya.L., Technology of building production [Electronic resource]: Textbook / Revich Ya. L., Rudomin E.N., Mazhaisky Yu.A. etc. - M. : DIA Publishing House, 2011. - 376 p. - ISBN 978-5-93093-798-5 - Access mode: <http://www.studentlibrary.ru/book/ISBN9785930937985.html>

*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](http://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 a student to do an internship, keep an internship diary and write an internship report\*:*

1. Guidelines for internship, maintenance of current and preparation of reporting documentation for students in the direction 08.04.01 Construction.

\*The training toolkit and guidelines for the internship are placed on the internship page in the university telecommunication training and information system under the set procedure.

## **8. ASSESSMENT TOOLKIT AND GRADING SYSTEM\* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL AS INTERNSHIP RESULTS**

The assessment toolkit and the grading system\* to evaluate the level of competences (competences in part) formation as the internship results are specified in the Appendix to the internship syllabus.

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



**DEVELOPERS:**

Associate Professor in the  
Department of Construction  
Technology and Structural  
Materials

\_\_\_\_\_  
position, educational department

\_\_\_\_\_  
signature

I.I. Gritsuk

\_\_\_\_\_  
name and surname

**HEAD OF EDUCATIONAL DEPARTMENT:**

Head of the Department of  
Construction Technology and  
Structural Materials

\_\_\_\_\_  
position, educational department

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A.V. Solovyeva

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name and surname

**HEAD OF  
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Associate Professor of the  
Department of Construction  
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Materials

\_\_\_\_\_  
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M.I. Rynkovskaya

\_\_\_\_\_  
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