Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Ястребов Олег Александрович
Должность: Ректор
Дата подписания: 27.04.2026 17:30:10
Уникальный программный ключ:
ca953a0120d891083f939673078ef1a989dae18a

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 programme developer)

Department of Construction Technology and Structural Materials
(department realizing the PhD program)

COURSE SYLLABUS

Methodology of Scientific Research
(course title)

Scientific specialty:

2.1.1. Building designs, buildings and constructions
2.1.5. Construction materials and products
2.1.6. Hydrotechnical structures, hydraulics and engineering hydrology
2.1.7. Technology and management in construction
2.1.9. Structural Mechanics
(scientific speciality code and title)

The PhD student's internship is implemented within the PhD programmes:

Building designs, buildings and constructions
Construction materials and products
Hydrotechnical structures, hydraulics and engineering hydrology
Technology and management in construction
Structural Mechanics
(PhD program title)

2026 г.

1. DISCIPLINE (MODULE) GOAL

The purpose of mastering the discipline "Methodology of scientific research" is to prepare for passing candidate exams, as well as to obtain knowledge, skills, abilities and experience in the field of scientific research, characterizing the stages of formation of competencies and ensuring the achievement of the planned results of mastering the educational program.

2. REQUIREMENTS TO PHD-STUDENTS ON FINISHING THE COURSE

Mastering the discipline "Methodology of Scientific Research" is aimed at preparing for passing candidate exams, as well as mastering the competencies:

1. knowledge of the methodology of theoretical and experimental research in the field of construction;
2. knowledge of the culture of scientific research in the field of construction, including the use of the latest information and communication technologies;
3. the ability to comply with the standards of scientific ethics and copyright;
4. the ability to professionally operate modern research equipment and devices;
5. knowledge of methods for developing scientific and methodological foundations for research, improvement, theoretical, experimental and technical and economic justification for the use of various technical solutions and technologies in construction.

3. WORKLOAD OF THE DISCIPLINE AND TYPES OF ACTIVITIES

The overall workload of the discipline « Methodology of Scientific Research » is 1 credit units (36 academic hours).

Types of activities		**Total ac. hrs.**	**Semesters**
			2
Classroom activities (total), including:		18	18
в том числе:			
Lectures (LC)		12	12
Laboratory activities (LA)		–	–
Practical lessons/Seminars (PC)		6	6
Independent work		18	18
Intermediate certification (test with assessment/exam)		–	–
Overall workload	ac. hrs.	36	36
	credits	1	1

4. CONTENT OF THE DISCIPLINE

Name of the discipline section	**Contents of the section (topic)**	**Type of study work**
Section 1. Theoretical Research	Topic 1.1. Science as a continuously developing system of knowledge of the objective laws of nature, society and thinking. The purpose of science. Scientific research. Objectives of scientific research. Topic 1.2. Fundamentals of the methodology of scientific research. Theoretical research. Applied research. Technical and technological development. Purpose of development. Topic 1.3. Scientific and technical information. Scientific direction. Scientific problem. Formulating the problem and putting forward a hypothesis. Scientific topic.	LC, PC

Section II. Planning Experiments and Observations	Topic 2.1. Fundamentals of the methodology of experimental research. Objectives and tasks of experimental research. Planning an experiment. Planning matrix. Topic 2.2. Random balance method. Random balance method. Construction of interpolation models. Process optimization (planning extreme experiments). Regression analysis. Factor experiment. Topic 2.1. Fundamentals of the methodology of experimental research. Objectives and tasks of experimental research. Planning an experiment. Planning matrix.	LC, PC
Section III. Experimental Research	Topic 3.1. Natural experiments. Artificial experiments. Computational experiments. Laboratory experiment. Natural experiment. Research (exploratory) experiment. Confirming experiment. Topic 3.2. Designing a method and selecting equipment. Preparing samples and elements. Developing a plan for monitoring variables. Topic 3.3. Conducting an experiment. Processing and interpreting the results. Preparing a scientific report. Topic 4.1. Comparison of the results of theoretical and experimental studies. Comparison criteria. Criteria for the adequacy of theoretical dependencies to experimental ones.	LC, PC
Section IV. Processing and Analysis of Research Results	Topic 4.2. Mathematical processing of experimental data. Analysis of the results of experimental studies. Topic 4.3. Preparing research results for publication and scientific periodicals. Scientific and technical report. Abstract.	LC, PC

5. EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Room Type	**Room Equipment**	**Specialized educational / laboratory equipment, software and materials for mastering the discipline**
Class for Seminars	Room for seminar-type classes, equipped with a set of specialized furniture, board (screen) and technical / multimedia gadgets	Not necessary
Self-Work Class	Room for self-working (can be used for lecture and seminars activities), equipped with a set of specialized furniture, board (screen) and technical / multimedia gadgets and computers with an access to EIPES	Not necessary

6. METHODOLOGICAL SUPPORT AND LEARNING MATERIALS

Main readings:

1. Svintsov A.P. Methods for solving scientific and technical problems in construction: Educational and methodological complex. M. RUDN University Press. 2018. 101 p.
2. Kashirin V. P. Theory of scientific research / V. P. Kashirin. -Krasnoyarsk: Krasnoyarsk State Agrarian University, 2007. - 184 p.
3. Sidnyaev N.I. Theory of experimental planning and analysis of statistical data / N. I. Sidnyaev. -M .: Yurait, 2011. - 399 p.

Additional readings:

1. Experimental planning in examples and calculations. / N. I. Bogdanovich et al.; -Arkhangelsk: Northern (Arctic) Federal University, 2010. - 126 p.
2. Rykov V. V. Mathematical statistics and planning of the experiment-M.: MAKS Press, 2010 - 303 p.
3. Kim E. N. Planning and organization of the experiment. / E. N. Kim, E. P. Lapteva-Vladivostok: Dalrybvtuz, 2009 - 188 p.
4. Rozhkov N. F. -Planning and organization of the measuring experiment. / N. F. Rozhkov. - Omsk: Publishing house of OmskGTU, 2009. - 106 p.

Internet sourses:

ELS RUDN University and third party EBS, to which university students have accessbased signed contracts:

- RUDN Electronic Library System, http://lib.rudn.ru/MegaPro/Web ;
- ELS University Library Online, http://www.biblioclub.ru ;
- EBS Urayt, http://www.biblio-online.ru ;
- ELS Student Consultant, http://www.studentlibrary.ru ;
- EBS Lan, http://e.lanbook.com ;
- EBS Trinity Bridge http://www.trmost.ru

Databases and search engines:

- Electronic fund of legal and normative-technical documentation, http://docs.cntd.ru ;
- Yandex search system https:// www .yandex.ru ;
- Google search system https://www.google.com ;
- Reference database Scopus , http://www.elsevierscience.ru/products/scopus

Educational and methodological materials for students' self-work studying the discipline / module:

A course of lectures on the discipline « Methodology of Scientific Research ».

7. ASSESSMENT TOOLKIT AND GRADING SYSTEM FOR MIDTERM ATTESTATION OF STUDENTS IN THE DISCIPLINE (MODULE)

Assessment toolkit and a grading system to evaluate the level of competences (competences in part) formation as the course results are specified on the TUIS platform.

DEVELOPERS:

Associate Professor A.S. Markovich

HEAD OF THE DEPARTMENT

Head of Department S.B. Yazyev