

**Federal State Autonomous Educational Institution of Higher Education
"Peoples' Friendship University of Russia"**

Institute of Environmental Engineering

WORKING PROGRAM OF THE DISCIPLINE

BASICS OF SCIENTIFIC RESEARCH

(наименование дисциплины/модуля)

Recommended by MSTs for the direction of training / specialty:

05.04.06 Ecology and environmental Management

08.04.01 «Construction»

(код и наименование направления подготовки/специальности)

The development of the discipline is carried out within the framework of the implementation of the main professional educational program of higher education (EP HE):

Environmental Engineering in Construction

(наименование (профиль/специализация) ОП ВО)

2022 г.

1. Aims and objectives of the discipline: The objectives of mastering the discipline "Fundamentals of Scientific Research" in accordance with the general objectives of the main professional educational program are:

- assimilation by students of knowledge about the methods of conducting scientific research;
- the formation of students' scientific understanding of the methods of collecting, processing, analyzing and presenting scientific information in scientific research.

The tasks of the discipline are:

- Development of students' ability to analyze the structural components of the scientific problem they study, the ability to establish their place and role in the system of society;
- Formation for students' scientific worldview,
- familiarization of students with the main methodological traditions and innovations; improving the skills of organizing research activities.

2. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF EP HE:

The discipline belongs to the compulsory disciplines of the variable part of the block __1__ curriculum.

Table No. 1 shows the previous and subsequent disciplines aimed at the formation of discipline competencies in accordance with the competency matrix EP HE.

Table No. 1 Previous and subsequent disciplines aimed at the formation of competencies

Code	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices*
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	mathematics, logic, philosophy, psychology, sociology, probability theory, statistics	writing a master's thesis
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	mathematics, logic, philosophy, psychology, sociology, probability theory, statistics	
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	Philosophy, logic, general ecology	writing a master's thesis
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	Culturology, Pedagogy and Psychology	
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	Foreign language	
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	mathematics, probability theory, statistics	
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	Jurisprudence,	
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	Psychology, Culturology	
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	Annotation and summarizing, Culturology, foreign language, logic, general ecology, philosophy	writing a master's thesis
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	Special disciplines of the master's program	
YK 1; OПК 1э; OПК 2э; ПК 3; OПК 1с; OПК 6с	Informatics, metrology, standardization and	

	certification, statistics, probability theory, information technology	
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3. REQUIREMENTS FOR THE RESULTS OF DISCIPLINE MASTERING :

Table 2. Mastering the discipline "Fundamentals of Scientific Research" is aimed at developing the following competencies (parts of competencies):

Code	Competencies	Competence achievement indicators (within this discipline)
YK 1	able to carry out a critical analysis of problem situations based on a systematic approach, to develop a strategy of actions.	YK 1.1 Able to analyze a problem situation as a system, identifying its components and relationships between them
		YK 1.2 Owns argumentation and develops a meaningful strategy for solving a problem situation based on a systematic and interdisciplinary approach
		YK 1.3 Knows the basics of the strategy and identifies possible risks, suggesting ways to eliminate them
ОПК 1э	Able to use philosophical concepts and methodology of scientific knowledge in the study of various levels of organization of matter, space and time	ОПК 1э.1 Knows the relationship between the intuitive, the unconscious and the conscious in scientific creativity, the social and psychological motives of scientific creativity; problems of moral evaluation of scientific creativity; bioethics; integrative trends of modern knowledge
		ОПК 1э.2 Uses the positions and categories of philosophy to evaluate and analyze various social trends, facts and phenomena related to the modern development of natural science and technology
		ОПК 1э.3 Owns the skills of historical and methodological analysis of scientific research and its results; all kinds of scientific communication; methods of conducting discussion and polemics, skills of public speech and written argumentative presentation of one's own point of view
ОПК 2э	Able to use special and new sections of ecology, geocology and nature management in solving research and applied problems of professional activity	ОПК 2э.1 Has a systematic understanding of the theoretical and methodological foundations of environmental regulation
		ОПК 2э.2 Knows the basic knowledge of the fundamental sections of biology in the amount necessary to master the basics in ecology and nature management
		ОПК 2э.3 Owns modern methods of obtaining and evaluating geochemical information for solving theoretical and practical problems of environmental geochemistry in the field of ecology and nature management in order to protect the environment
ПК 3	Able to carry out and organize scientific research of industrial and civil construction facilities,	ПК 3.1 Able to study the natural, technogenic, socio-economic, demographic and biomedical situation, search for cultural heritage objects in the study area, explore industrial and civil construction projects

Code	Competencies	Competence achievement indicators (within this discipline)
	including in the field of environmental management	<p>ПІК 3.2 Possesses the skills to perform studies of environmental objects, incl. industrial and civil engineering, chemical, microbiological, parasitological, toxicological indicators</p> <p>ПІК 3.3 Able to collect and analyze information about the natural and man-made environment, physical, geographical and climatic conditions, incl. in industrial and civil construction, based on materials from past years</p>
ОПІК 1с	Able to solve the tasks of professional activity based on the use of theoretical and practical foundations, mathematical apparatus of fundamental sciences	<p>ОПІК 1с.1 Able to apply the theoretical and practical foundations of fundamental sciences in solving professional problems</p> <p>ОПІК 1с.2 Able to apply the theoretical and practical foundations of fundamental sciences in solving professional problems</p> <p>ОПІК 1с.3 Able to solve professional problems based on the use of knowledge of the mathematical apparatus of fundamental sciences</p>
ОПІК 6с	Able to carry out research of objects and processes in the field of construction and housing and communal services	<p>ОПІК 6с.1 Able to conduct scientific and scientific-practical research in the field of construction and housing and communal services</p> <p>ОПІК 6с.2 Able to evaluate the scientific and technical results obtained in Russia and (or) abroad in new and (or) promising scientific areas in the field of construction and housing and communal services</p> <p>ОПІК 6с.3 Has the skills to carry out research of objects and processes in the field of construction and housing and communal services</p>

4. SCOPE OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

The total labor intensity of the discipline "*Fundamentals of scientific research*" is 2 credit.

Таблиця 3. Types of educational work by periods of mastering the EP HE for FULL-time education

Type of educational work	TOTAL, ac.h.	Semester(s)			
		1	2	3	4
Contact work, ac.h.	72		72		
including:					
Lectures (L)	30		30		
Laboratory work (LW)					
Practical/seminar classes (SC)					
Independent work of students, ac.h.	28		28		
Control (exam / test with assessment), ac.h.	14		14		
Total labor intensity of the discipline	ac.h.	72	72		
	credit	2	2		

Таблиця 4. Types of educational work by periods of mastering the EP HE for CORRESPONDENCE forms education*

Type of educational work	TOTAL, ac.h.	Semester(s)			
		1	2	3	4
Contact work, ac.h.	72				
including:					
Lectures (L)	6		6		
Laboratory work (LW)					
Practical/seminar classes (SC)					
Independent work of students, ac.h.	62		62		
Control (exam / test with assessment), ac.h.	4		4		
Total labor intensity of the discipline	ac.h.	72	72		
	credit	2	2		

* - filled in in case of implementation of the program in correspondence forms education

5. CONTENT OF THE DISCIPLINE

Table 5.1. Content of the discipline (module) by type of academic work

№	Name of the discipline section	Content of the section (topics)
1.	Fundamentals of the methodology of scientific creativity	Introduction to the methodology of scientific creativity, basic terms and definitions, structure of research activities, relevance and scientific novelty, classification of scientific research methods, tools for identifying problems, methods aimed at enhancing the use of experience and intuition of specialists, logical laws.
2.	Introduction to Information Retrieval Theory	Information, types of information, ascending/descending information flows, the birth of information, the law of information scattering. Search for information, search for information on the Internet, use of libraries and databases.
3	Empirical methods of knowledge	Methods of empirical knowledge, observation, measurement, measurement scales, measurement errors, the concept of an experiment, experiment planning, processing of experimental results, surveys, interviews, expert surveys, etc.
4	General requirements for the thesis	General requirements for research work, the basics of scientific citation, the effectiveness of scientific research, the concept of plagiarism in scientific activity, discoveries, their mechanism and typology.
5	Other activities	Methodology of practical activity, methodology of artistic and educational activity, organization of collective activity.

5.2. Practical classes (seminars)

№ π/π	№ of the discipline section	Topics of practical classes (seminars)	Labor intensity (hour)
1.	1	Relevance, scientific novelty, goals and objectives of the Final Qualifying Work (FQW) Problem identification tools Methods aimed at activating the use of experience and intuition of specialists	3

2.	2	Search for information using various the database	2
3	3	Expert surveys (preparation of a scientific article)	5
4	4	Rules for writing FQW, information efficiency of FQW, Methods for calculating the percentage of personal participation Types of discoveries.	5
5	5	Organization of collective activity	3

6. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE:

Computers with installed software and Internet access. Interactive whiteboard (projector)

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

a) basic literature_

1. Shai O, Reich Y, Hatchuel A, Subrahmanian E (2013) Creativity and scientific discovery with infused design and its analysis with C-K theory. Research in Engineering Design 24 (2):201-214. (the materials are posted on Researchgate)
2. Ross, S. M., & Morrison, G. R. (2004). Experimental research methods. In Handbook of research on educational communications and technology (Vol. 2, pp., 1021–1043). Routledge. Taylor & Francis: https://www.researchgate.net/publication/201382131_Experimental_Research_Methods
3. Rules of preparation and registration of the final qualifying work of a student of the RUDN. (materials are posted on the RUDN educational portal).

б) additional literature

4. Noah, S.M., 2002. Research Methodology: Philosophy, Theory and Practice. University Putra Malaysia, Serdang, ISBN: 983-2373-38-7, pp: 85-96 (the materials are posted on Researchgate)

a) software: Word, Excell., Power point

б) databases (DB), information and reference and search systems: Yahoo, Infoseek, Lycos, Excite, Look Smart, Euroseek, Alta Vista, АУ, Созвездие Интернет, Rambler, Апорт, WebRing10.

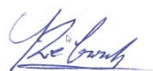
8. EVALUATION MATERIALS AND SCORE-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCES IN THE DISCIPLINE

Evaluation materials and a score-rating system* for assessing the level of competence formation (part of competencies) based on the results of mastering the discipline "Project Management" are presented in the Appendix to this Work Program of the discipline.

* - ОМ и БРС формируются на основании требований соответствующего локального нормативного акта РУДН.

Developers:

Associate Professor



Y.N. Rebut

Program Supervisor

Director of the Department
of Environmental Management

должность, название кафедры



подпись

D.E. Kucher
инициалы, фамилия

**Director of the Department
of Environmental Management**
название кафедры



подпись

D.E. Kucher
инициалы, фамилия