

Документ подписан простой электронной подписью  
Информация о владельце:  
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**Federal State Autonomous Educational Institution of Higher Education  
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA  
NAMED AFTER PATRICE LUMUMBA  
RUDN University**

**Institute of Environmental Engineering**

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

## **COURSE SYLLABUS**

Methodology of Scientific Research

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(course title)

Scientific specialty:

**1.5.15 Ecology**

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(scientific speciality code and title)

The course instruction is implemented within the PhD programmes:

**Ecology: Modern environmental Studies**

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(PhD program title)

## 1. DISCIPLINE (MODULE) GOAL

The purpose of mastering the discipline "Methodology of scientific research" is: - acquisition by postgraduate students of knowledge about the methods of scientific research; - Formation in postgraduate students of scientific ideas about the methods of collecting, processing, analyzing and presenting environmental information in scientific research.

## 2. REQUIREMENTS TO PHD-STUDENTS ON FINISHING THE COURSE

As a result of studying the discipline, a postgraduate student should:

### Know:

the main patterns of development of methodological approaches in ecology;  
mechanisms, influence of methodological guidelines on formation of scientific paradigms;  
concepts of scientific creativity;

### Be able to:

formulate a problem of scientific research;  
identify and schematize cognitive methods in accordance with the problem;  
draw up a plan of scientific research in accordance with the task;  
use methodological approaches for analysis of the obtained results;  
present and present scientific results.

### Possess:

methods of conducting scientific research in ecology;  
skills of organizing and conducting scientific research;  
skills of choosing methods for testing scientific hypotheses;  
the basics of presenting data and conducting scientific discussions.

## 3. WORKLOAD OF THE DISCIPLINE AND TYPES OF ACTIVITIES

The overall workload of the discipline « Methodology of Scientific Research» is 2 credit units (72 academic hours).

Types of activities	Total ac. hrs.	Semesters	
		1	
<i>Classroom activities (total), including:</i>			
в том числе:			
Lectures (LC)	12	12	
Laboratory activities (LA)			
Practical lessons/Seminars (PC)	6	6	
<i>Independent work</i>	36	36	
<i>Intermediate certification (test with assessment/exam)</i>	18	18	
Overall workload	ac. hrs.	<b>72</b>	<b>72</b>
	credits	<b>2</b>	<b>2</b>

## 4. CONTENT OF THE DISCIPLINE

Name of the discipline section	Contents of the section (topic)	Type of study work
Methodology of scientific knowledge. Direction of scientific research. Features of scientific research in ecology. Scientific information.	Basic terms and definitions, structure of research activity, relevance and scientific novelty, classification of scientific research methods. Direction of scientific research: approaches to selection, problem, relevance, working hypothesis. Information, Information search, information search on the Internet, use of libraries and databases. Methods of empirical knowledge,	L, S

Methods of theoretical and experimental research and processing of results in ecology. Fundamentals of modeling.	Statistical and Mathematical Methods in Ecology. Reliability and Validity of the Obtained Data. Systems Approach. Systems Ecology. Field Observation Methods Used in Ecology. Features of Ecological Experiments. Statistical and Mathematical Methods in Ecology. Reliability and Validity of the Obtained Data. Experiment, Analysis Approaches. Collection and Analysis of Databases. Application of Modeling in Ecological Research.	L, S
Research work. Dissertation as a qualifying work.	General requirements for research work, principles of scientific citation, effectiveness of scientific research, concept of plagiarism in scientific activity, discoveries, their mechanism and typology. Planning of the dissertation. Responsibilities of the dissertation supervisor. Structure and design of the dissertation. Approaches to presentation of dissertation data. Presentation of the work.	L, S
Presentation of data. Structure of works and approaches to writing, features of scientific works, applications and patents in ecology. Conferences, forums, seminars, etc. Conference - participation and organization. Scientific articles.	Types of scientific articles. Types and ratings of journals. Citation index. Modern requirements for writing articles. Types of scientific events. Objectives of participation in conferences, etc. Presentation of materials. Scientific discussion and its importance in promoting research, conducting scientific discussion. Approaches to organizing conferences.	L, S
Patent. Financial support for research. Grant and grant report. Research team	Patent. Patent structure, patent application preparation and registration. Grants. Funds. Paid scientific activity under contracts. Grant application, research planning and application preparation. Research team, organization, forms of cooperation	L, S
The role of science and the personality of the scientist in modern society. Ethical aspects of scientific research in ecology	Scientist ratings. The role of a scientist in modern society. Ecologist's code of ethics. Rules of biological ethics in scientific research. Legal foundations of environmental ethics. Organization of research on the territory of other states.	L, S

### 5. EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Room Type	Room Equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline
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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) Luis M. Camarinha-Matos SCIENTIFIC RESEARCH. METHODOLOGIES AND TECHNIQUES. <http://www.uninova.pt/cam/teaching/SRMT/SRMTunit2.pdf>
- 2) Anol Bhattacharjee Social Science Research: Principles, Methods, and Practices University of South Florida Scholar Commons, 2012, 159 p
- 3) Ivanova T.B. Methodology of Scientific Research [Текст/электронный ресурс] = Методология научного исследования : Education and Methodical Complex / Т.Б. Иванова. - Книга на английском языке; Электронные текстовые данные. - М. : PFUR, 2013. - 117 p. - ISBN 978-5209-05048-3 : 167.79.
- 4) The Scientific Method. by Science Made Simple  
[http://www.sciencemadesimple.com/scientific\\_method.html](http://www.sciencemadesimple.com/scientific_method.html)
- 5) Conducting a debate [http://www.edu.gov.mb.ca/k12/cur/socstud/frame\\_found\\_sr2/tns/tn-13.pdf](http://www.edu.gov.mb.ca/k12/cur/socstud/frame_found_sr2/tns/tn-13.pdf)
- 6) SCIENTIFIC DEBATE  
<http://www.howell.k12.nj.us/twroot/mms/jlangenberger/914/downloads/newdebate.pdf>

### *Additional readings:*

- 1) Gary W. Oehlert A First Course in Design and Analysis of Experiments, Library of Congress Cataloging-in-Publication Data. SBN 0-7167-3510-5 2010. 660p  
<http://users.stat.umn.edu/~gary/book/fcdae.pdf>
- 2) Stefanie Stantcheva How to Run Surveys: A guide to creating your own identifying variation and revealing the invisible 20226 38p6  
[https://scholar.harvard.edu/files/stantcheva/files/How\\_to\\_run\\_surveys\\_Stantcheva.pdf](https://scholar.harvard.edu/files/stantcheva/files/How_to_run_surveys_Stantcheva.pdf)
- 3) The 9 Most Controversial Science Stories in 2009  
<http://www.foxnews.com/tech/2009/12/28/controversialscience-stories.html>
- 4) Imre Lakatos Criticism and the Methodology of Scientific Research Programmes, 2009

### *Информационное обеспечение дисциплины (онлайн-курсы):*

Онлайн-курс английского для экологов [www.careerpaths-esp.com](http://www.careerpaths-esp.com)

MOOC Academic writing <https://www.futurelearn.com/courses/emi-academics>

MOOC Academic writing for Intermediate students

<https://www.futurelearn.com/courses/english-for-study-intermediate>

MOOC How to do a literature review <https://www.futurelearn.com/courses/research-writing>

MOOC Developing your research project <https://www.futurelearn.com/courses/research-project>

MOOC Working with translation, theory and practice

<https://www.futurelearn.com/courses/working-with-translation>

MOOC Writing better emails <https://www.futurelearn.com/courses/better-emails>

MOOC Writing an academic essay: Learning English for academic

purposes <https://www.futurelearn.com/courses/writing-essays-english-academic-purposes>

MOOC Technical report writing for engineers

<https://www.futurelearn.com/courses/technical-report-writing-for-engineers>

*Internet sources:*

ELS RUDN University and third party EBS, to which university students have access based 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](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:*

## **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 of the Department  
of Nature Management

Rrebukh Nazikh Yaser

### **HEAD OF THE DEPARTMENT**

Head of the Department  
of Nature Management

Kucher D.E.