

*Federal state autonomous educational institution of higher professional education
“People’s Friendship University of Russia”*

Faculty of ecology
Recommended by MSSN

DISCIPLINE PROGRAM

Title of the discipline EXPERIMENTAL ECOTOXICOLOGY

Recommended for the direction of training / specialty

05.06.01 Earth Sciences

Direction of the program (profile)

Ecology: modern environmental studies

1. Goals and objectives of the discipline:

The academic discipline "Experimental Ecootoxicology" is included in the compulsory minimum of the basic educational training program.

The aim of studying the course "Experimental Ecoecootoxicology" is the acquisition of theoretical knowledge in the field of experimental toxicology by graduate students, as well as practical skills necessary for the successful implementation of professional activities.

The objectives of the course include:

- formation of a system of concepts of ecotoxicology;
- study of the toxic effects of the influence of chemicals on living organisms at the cellular and molecular levels;
- study and preparation of toxicity passports for substances entering the environment;
- study of the effect on the body and human life of various concentrations of volatile phytoorganic substances;
- development of MPC standards for pollutants
- development of ecological thinking and skills of practical application of theoretical knowledge

2. Place of discipline in the structure of the educational program:

Discipline refers to the variative part of the curriculum.

Table 1 shows the previous and subsequent disciplines aimed at the formation of the competencies of the discipline in accordance with the matrix of competencies

Table 1

Previous and subsequent disciplines aimed at the formation of competences

№ п/п	Code and name of competency	Previous disciplines	Subsequent disciplines (groups of disciplines)
Basic competencies			
BC-3:	To have the willingness to participate in the work of Russian and international research teams to solve scientific and scientific-educational problems	Methodology of scientific research Stability of natural systems	Environmental Management Environmental Impact Assessment
BC-4:	To own the readiness to use modern methods and technologies of scientific communication in the state and foreign languages, including readiness for communication in oral and written forms in Russian and foreign languages for solving problems of professional activity, possession of foreign language communicative competence in the official business, academic, scientific, social and cultural, everyday-household spheres of foreign language communication	Stability of natural systems	Environmental Management Environmental Impact Assessment
General professional competencies			
GPC-1	To own the ability to independently carry out research activities in the relevant professional field using modern research methods and information and communication technologies	Stability of natural systems	Environmental Management Environmental Impact Assessment

GPC-2	To have a willingness to teach in the main educational programs of higher education	Stability of natural systems	Environmental Management Environmental Impact Assessment
Professional competencies			
	PC-2 To be able to diagnose problems of nature protection in modern cities, assess the impact of planned facilities or other forms of economic activity and develop practical recommendations for environmental protection and sustainable development in the urban environment based of the environmental assessments, environmental management approaches and knowledge of responses of organisms on the pollution (environmental toxicology)	Stability of natural systems	Environmental Management Environmental Impact Assessment
	PC-3 To be able to analyze and assess the impact of the environment on human health and life in the conditions of modern cities as well as to organize environmental protection and human health protection	Stability of natural systems	Environmental Management Environmental Impact Assessment

3. Requirements to the results of mastering the discipline:

The process of studying the discipline is aimed at the formation of the following competencies:

<i>General professional competencies</i>	
To own the ability to carry out research activities in the relevant professional field independently with using modern research methods and information and communication technologies	GPC-1
To have a willingness to teach in the main educational programs of higher education	GPC-2
<i>Basic competencies</i>	
the ability to critically analyze and evaluate modern scientific achievements, generate new ideas when solving research and practical problems, including in interdisciplinary fields	BC-1
the ability to design and carry out complex research, including interdisciplinary, based on a holistic systemic scientific worldview using knowledge in the field of history and philosophy of science	BC-2
willingness to participate in the work of Russian and international research teams to solve scientific and scientific and educational problems	BC-3
the ability to plan and solve problems of one's own professional and personal development	BC-5
<i>Professional competencies</i>	
be able to diagnose problems of nature protection, assess the impact of planned structures or other forms of economic activity and develop practical recommendations for nature protection and sustainable development	PC-2
be able to analyze and assess the impact of the environment on human health and life;	PC-3

As a result of studying the discipline, a graduate student must:

Know: the effects of industrial toxicants on the human body.

Be able to: determine the possible ways of penetration of toxic substances into the human body; draw up a toxicity passport of the substance.

Possess: methods of processing, analysis, synthesis and interpretation from the ecological point of view of toxicological laboratory studies; know the methods for determining MPC and toxic doses.

4. The volume of discipline and types of educational work

Type of study	Hours	Semesters			
		3			
Class hours (total)	60	3			
<i>Including:</i>	-	-	-	-	-
Lectures	10	10			
Practical training	20	20			
Seminars					
Laboratory works					
Independent work (total)	87	87			
General: labor input, hour.	144	144			
General: labor input, credits	4	4			

5. The content of the discipline

5.1 the content of the sections of the discipline

№ п/п	Course units (Topics)	Course units (Topics) Outline
1.	Part 1. Introduction to environmental toxicology	Main concepts of toxicology. Objects and methods. Basic principles
2.	Part 2. Experiment in environmental sciences	Principles of organization. Use of data obtained: main restrictions and requirements.
3.	Part 3. Practical methods of environmental toxicology	Toxicological criteria. Assessment of toxic features of main pollutants. Toxicological experiments as a base of the development of environmental quality norms.

5.2* Sections of disciplines and types of classes

№ п/п	Name	Lectures	Practical lessons	Indep. work	Control	Hours total
1.	Part 1. Introduction to environmental toxicology	2	4	27	9	42
2.	Part 2. Experiment in environmental sciences	4	8	30	9	51
3.	Part 3. Practical methods of environmental toxicology	4	8	30	9	51

6. Laboratory practice (if applicable) - NO

7. Practical classes (seminars)

No	Unit	Topics	Hours
1.	Course units (Topics)	Course units (Topics) Outline	
2.	Part 1. Introduction to environmental toxicology	Main concepts of toxicology. Objects and methods. Basic principles	4
3	Part 2. Experiment in environmental sciences	Principles of organization. Use of data obtained: main restrictions and requirements.	8
4	Part 3. Practical methods of environmental toxicology	Toxicological criteria. Assessment of toxic features of main pollutants. Toxicological experiments as a base of the development of environmental quality norms.	8

8. Material and technical support of the discipline:

An audience equipped with multimedia equipment and a personal computer with a standard office suite.

9. Information support of discipline

When studying the discipline, traditional information technologies are used to represent the theoretical part of the material by the teacher (PowerPoint presentations).

For more details about application of different procedures of environmental support in project cycle see monograph Ledascheva T.N., Pinaev V.E. "Environmental support of projects" publ. Mir Naiki and online course "HSE management and audit" www.rudn.ru

a) software

MS Windows MS Office

b) databases, reference and search engines

www.mnr.gov.ru - website of the Ministry of Natural Resources of the Russian Federation;

<http://rpn.gov.ru/> - Federal Service for Supervision of Natural Resources Use (Rosprirodnadzor);

www.ecoindustry.ru - site of the journal "Production Ecology";

www.unep.org - website of the United Nations Environment Program;

www.wwf.ru - WWF website.

<http://burondt.ru/> - BAT website - information on the implementation of regulation based on the best available technologies

http://www.mnr.gov.ru/activity/directions/zelenye_standarty/zelenye_standarty/?sphrase_id=124597 - information on the development, application and implementation of "green standards"

http://www.mnr.gov.ru/activity/directions/natsionalnyy_proekt_ekologiya/ - information on the implementation of the Ecology National Project

www.epa.gov - United States Environmental Protection Agency | US EPA

www.eea.europa.eu - European Environment Agency's home page

<https://www.unece.org/fileadmin/DAM/env/eia/documents/legaltexts/protocolenglish.pdf>

10. The educational-methodical and informational support of the discipline:

a) Main literature

1) Emilia Kolarzyk Selected topics on hygiene and human ecology <http://www.e-nujag.cm-uj.krakow.pl/materialy/higiena/main.pdf>

2) The ecology and inter-relationship between housing and health outcomes Gary Garner Paper delivered to the International Conference on Infrastructure Development and the Environment (Iciden-Abuja 2006). <http://eprints.qut.edu.au/7216/1/7216.pdf>

3) International Journal of Hygiene and Environmental Health <http://www.journals.elsevier.com/international-journal-of-hygiene-and-environmental-health>

4) OCCUPATIONAL SAFETY AND HEALTH CENTER DEPARTMENT OF LABOR AND EMPLOYMENT Intramuros, Manila February 2005-May 2013 http://www.oshc.dole.gov.ph/UserFiles/oshc2010/file/OSH_Standards_Amended_1989_Latest.pdf

5) GUIDE FOR THE CLASS NOTATION GREEN PASSPORT (GP) American Bureau of Shipping https://www.eagle.org/eagleExternalPortalWEB/ShowProperty/BEA%20Repository/Rules&Guides/Current/158_GreenPassport/GreenPassportGuide

6) Principles of Physiological Regulation of the Body Functions in Incomplete Adaptation S. G. Krivoshchekov, G. M. Divert <http://link.springer.com/article/10.1023/A:1007175828371>

7) Effect of Altitude on the Heart and the Lungs Peter Bärtsch and J. Simon R. Gibbs <http://circ.ahajournals.org/content/116/19/2191>

8) The concept of adaptation : interdisciplinary scope and involvement in climate change Guillaume Simonet <https://sapiens.revues.org/997>

9) What Are the Limits of Human Survival? By Natalie Wolchove <http://www.livescience.com/34128-limits-human-survival.html>

10) The Biology of Human Survival: Life and Death in Extreme Environments : Claude A. Piantadosi
<https://books.google.ru/books?id=Lqz-4XU5m28C&pg=PA1&lpg=PA1&dq=Human+survival+in+extreme+conditions&source=bl&ots=j8fL6tZo-F&sig=ZmSSWKHQIaKRGdjnT80Gv0nEX1I&hl=ru&sa=X&ved=0ahUKEwje6cjTt5LPAhWF2SwKHcEkB5c4ChDoAQgqMAM#v=onepage&q=Human%20survival%20in%20extreme%20conditions&f=false>

11. Methodical instructions for students on mastering the discipline (module)

Independent work of students includes:

- individual study of theoretical material on the subject of the course (links to information sources are presented in the previous sections);
- study of additional material presented in the course “Experimental Ecotoxicology” (paragraph 9 of this program);
- preparation of essays on the topics specified in the program.

11.1. Self-study of additional theoretical material is carried out by students in an individual mode; The list of recommended information sources is given above.

11.2. 11.3. Requirements for writing essays

Academic ethics, copyright compliance. In the first lesson, students are informed about the need to comply with academic ethics and copyright during the training. In particular, information is provided:

- general copyright information;
- citation rules;
- rules for registration of links

All footnotes in the text are carefully verified and provided with “addresses”. It is not permissible to include extracts from the works of other authors in this work without indicating this, retelling someone else's work close to the text without reference to it, using someone else's ideas without specifying the source. This also applies to sources found on the Internet.

You must specify the full address of the site. All cases of plagiarism should be excluded. If unjustified and incorrect borrowings are identified, the abstract is not accepted.

When preparing written works, the following must be submitted without fail: work plan; list of used literature, drawn up in accordance with the current rules of the bibliographic description of the sources used.

For the preparation of the abstract, only special relevant sources should be used. In addition to abstracts, the subject of which is connected with the dynamics of any phenomena over many years, or the historical development of scientific views on any problem, sources should be used for a period of not more than 10 years.

A prepared essay should be presented at one of the classes in agreement with the teacher. Using PowerPoint presentations (or prepared using similar licensed or freeware programs) is encouraged, but not required. Estimated time of the report is up to 15 minutes. The structure of the report and additional requirements for the quality of materials are determined by the chosen topic and are additionally discussed with the teacher.

12. Fund of assessment tools for intermediate certification of students in the discipline (module)

Materials for assessing the level of mastering the educational material of the discipline "Experimental toxicology" (evaluation materials), including a list of competencies indicating the stages of their formation, a description of indicators and criteria for evaluating competencies at various stages of their formation, a description of the assessment scales, typical control tasks or other materials necessary to assess knowledge, skills, skills and (or) experience of activity, characterizing the stages of the formation of competencies in the process of mastering the educational program, methodological materials that determine the procedures for assessing knowledge, skills, skills and

(or) experience of activities that characterize the stages of the formation of competencies are developed in full and are available for students on the discipline page at TUIS RUDN.

The program has been drawn up in accordance with the requirements of the ES of HE RUDN University.

Head of Program
Head of Department
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