

*Federal State Autonomous Educational Institution for Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
(RUDN University)*

Institute of Environmental Engineering

COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program
Economics of natural resources management

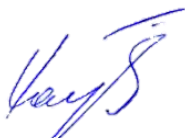
Course title		<i>Economic aspects of natural resources management</i>
Course Workload		2 ECTS (108 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction	Introduction. Methods for assessing natural resources. Natural resource potential: economic assessment methods.
2.	Economic assessment of non-renewable resources	Economic assessment of non-renewable resources: main features. Approaches to the economic assessment. Practical examples
3	Economic assessment of renewable resources	Economic assessment of renewable resources: main features. Approaches to the economic assessment. Practical examples.
4	The resource base of enterprises, methods of its assessment and analysis of the effectiveness of use	The resource base of enterprises, methods of its assessment and analysis of the efficiency of use. The concept of the natural intensity of technological processes. Possibilities of regulating the natural intensity. Environmental and economic damages as "negative resources": assessment methods. The principles of the "green economy" and the possibilities of their practical implementation at enterprises.
5	Multifunctional resources and the specifics of their assessment in projects	Alternative estimates of natural resources. Multifunctionality of resources and problems of ensuring the efficiency of natural resources use.

The program is compiled in accordance with the requirements of the educational standard of higher education of the RUDN

DEVELOPER:

Professor-Consultant of the
ESandPQM Department

Должность, БУП



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Khaustov A.P.

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Redina M.M.

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>Engineering ecology</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Anthropogenic processes as a factor of environmental pollution.	Modern anthropogenic activity and environmental pollution. Global and local processes and their modelling, assessment and forecast.
2.	Self-cleaning ability of ecosystems. Parameters of ecosystem sustainability	The principles of the existence of ecosystems. Homeostasis. Types of resilience. The cycle of substances and elements. Self-cleaning ability of ecosystems. Abiotic self-purification processes. Biotic self-purification processes. Soil microbiocenosis. Microbiocenosis of water bodies. Microflora of the air. The degree and speed of self-cleaning. Assimilation capacity of the ecosystem.
3	Wastewater & Sewage Treatment. Sediments of Wastewater	The main sources of wastewater. Composition and Sources of Wastewater. Types of Wastewater Pollution (according to physic and chemical properties). Atmospheric Sewage or Runoff. Household Wastewater. Modern Methods of Sewage Treatment (according to the mechanism of action). Technological Treatment Schemes
4	Sources and types of atmospheric pollution	Sources and types of atmospheric pollution. Environmental protection technologies.
5	Solid Waste Treatment Technologies: Secondary Raw Materials Recycling, Thermal Processing.	Pyramid of the waste management. Waste as the “secondary resources”: recycling and “waste to energy” technologies. Norms for the assessment of the waste danger. Norms of the waste formation, accumulation, storage and processing
6	Landfilling	Sources of Industrial Solid Waste (ISW). Ecological Features of ISW. Methods of Industrial Nonradioactive Waste Elimination and Processing. Basic Methods of Municipal Waste Processing. Sorting and Using as Secondary Raw Materials. Rational MSW sorting scheme. “Dry” mechanical or Physical methods. The main technological indicators of the efficiency of separation of solid waste
7	Water bodies Remediation Technologies	Types of water bodies. Types of pollutants of water bodies. Sources of water pollution. Water restoration methods. Stages of environmental remediation of water

		bodies and preparatory works: technical, biological. Creation (restoration) of the coastal ecosystem. Comprehensive improvement of the surrounding area. Examples. Purification of water objects from oil products. Reducing the concentration of pollutants in water bodies
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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program
Economics of natural resources management

Course title		<i>Environmental accounting and reporting</i>
Course Workload		2 ECTS (72 academic hours)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction.	Environment as an object of statistical observation. Sources of statistical data in the sphere of environmental protection, environmental safety and nature management
2.	State statistical observation	State statistical observation. Systems of accounting and reporting. Theoretical basics of environmental statistics. Characteristics of natural resources as a part of national welfare. System of indicators of statistics of natural resources. Environment and Natural Resources Statistics
3	Environmental statistics for enterprises	Statistical observation in the field of environmental management and sustainable development at the level of enterprises and companies. Reporting formats. Use of Observations
4	Environmental accounting and reporting	International practice. Standards of non-financial reporting. Green reporting. GRI standards.
5	Environmental accounting and reporting as an informational base for the analyses	Environmental accounting and reporting as an informational base for the analyses. Sources of data and approaches to their analyses. Sustainability indicators of an organization.

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>Environmental norms for sustainability</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction	Sustainability and sustainable development. Nature management and environmental safety. Sustainability of the natural systems and their development trajectory. Environmental norms as an instrument of nature management. Types of the standards.
2.	Environmental norms and regulations for the atmosphere protection	Factors of the pollution and self-purification of the atmosphere. Main models of the atmosphere pollution. Norms of the atmospheric quality: approaches to the setting of norms and examples. Regulation of the atmospheric pollution
3	Environmental norms and regulations for the protection of water quality	Factors of the pollution and self-purification of the water bodies. Basic models of the pollution of water flows: the Russian experience. Norms of water quality
4	Environmental norms and regulations for the protection of soil	Soil quality standards: approaches to justification of norms, types of norms, examples
5	Waste in the nature management	Pyramid of the waste management. Waste as the “secondary resources”: recycling and “waste to energy” technologies. Norms for the assessment of the waste danger. Norms of the waste formation, accumulation, storage and processing
6	Specific environmental pollutants and their regulation	Oil and petroleum products in the environmental media: some regulation approaches in Russia and abroad. Polycyclic aromatic hydrocarbons and their regulation in the environments: main environmental properties of PAHs, their marker role, examples of the norms in the world
7	Harmonization of environmental standards in the field of impacts on soil and land resources.	The system of norms and standards in the field of assessing the quality and use of soil and land resources: basic principles and approaches. Current documents and prospects for modernization
8	Harmonization of environmental standards in the field of waste	The system of norms and standards in the field of assessing the quality and use of underground hydrosphere resources: basic principles and approaches. Current

	management	documents and prospects for modernization
9	Best available technologies	The register of the best technologies. Prospects for the application of rationing based on the best existing technologies in Russia
10	Rationing of specific pollutants	POPs, hydrocarbons, heavy metals. Domestic and foreign approaches. Prospects for the modernization of domestic standards
11	Environmental norms and standards and economics	Environmental regulations and standards as a basis for the development of economic methods of environmental management regulation
12	Environmental regulation and environmental design	Environmental regulations and standards in projects. Green standards

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>Environmental standards and nature management</i>
Course Workload		3 ECTS (108 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction	Modern problems of nature management. Environmental norms and standards as a base for the efficient nature management
2.	Environmental norms and regulations for the atmosphere protection	Factors of the pollution and self-purification of the atmosphere. Main models of the atmosphere pollution. Norms of the atmospheric quality: approaches to the setting of norms and examples. Regulation of the atmospheric pollution
3	Environmental norms and regulations for the protection of water quality	Factors of the pollution and self-purification of the water bodies. Basic models of the pollution of water flows: the Russian experience. Norms of water quality
4	Environmental norms and regulations for the protection of soil	Soil quality standards: approaches to justification of norms, types of norms, examples
5	Environmental norms and regulations in the waste management	Pyramid of the waste management. Waste as the "secondary resources": recycling and "waste to energy" technologies. Norms for the assessment of the waste danger. Norms of the waste formation, accumulation, storage and processing

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Higher Education Field 05.04.06 Ecology and nature management

Higher education program
Economics of natural resources management

Course title		<i>Environmental statistics</i>
Course Workload		2 ECTS (72 academic hours)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction.	Environment as an object of statistical observation. Sources of statistical data in the sphere of environmental protection, environmental safety and nature management
2.	State statistical observation	State statistical observation. Systems of accounting and reporting. Theoretical basics of environmental statistics. Characteristics of natural resources as a part of national welfare. System of indicators of statistics of natural resources. Environment and Natural Resources Statistics
3	Environmental statistics for enterprises	Statistical observation in the field of environmental management and sustainable development at the level of enterprises and companies. Reporting formats. Use of Observations
4	Methods of statistical data processing and analyses	Methods of statistical processing and data analysis. Correlation-regression analysis. Basic concepts of correlation and regression analysis. The main tasks and prerequisites for the use of the correlation-regression method. Correlation-regression analysis of natural resources of the Russian Federation
5	Applied data analyses	Statistical methods and data analysis for processing the results of environmental monitoring. Classifications in ecological geochemistry. Data analysis in environmental economics

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Наименование БУП	Подпись	Фамилия И.О.
HEAD OF THE HIGHER EDUCATION PROGRAM: Professor of the ESandPQM Department		Redina M.M.

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program
Economics of natural resources management

Course title		<i>Estimations of natural resources</i>
Course Workload		3 ECTS (108 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction	Natural resources in the nature management. Classifications of natural resources
2.	Qualitative and quantitative evaluations of mineral resources	Qualitative and quantitative evaluations of mineral resources, main criteria, indicators, approaches, problems and practice in the countries of the world
3	Qualitative and quantitative evaluations of water resources	Qualitative and quantitative evaluations of water resources, main criteria, indicators, approaches, problems and practice in the countries of the world
4	Qualitative and quantitative evaluations of biological resources	Qualitative and quantitative evaluations of biological resources, main criteria, indicators, approaches, problems and practice in the countries of the world
5	Qualitative and quantitative evaluations of energy resources	Qualitative and quantitative evaluations of energy resources, main criteria, indicators, approaches, problems and practice in the countries of the world

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>History and methodology of ecology and natural resources management</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Modern environmental science	Development of environmental sciences. Ecology and a system of environmental disciplines.
2.	18th and 19th century Ecological studies	Arcadian and Imperial Ecology Carl Linnaeus and Systema Naturae The botanical geography and Alexander von Humboldt The notion of biocoenosis: Wallace and Möbius Foundation of ecology as discipline Malthusian influence Darwinism and the science of ecology
3	20th century	Expansion of ecological thought The biosphere – Eduard Suess and Vladimir Vernadsky The ecosystem: Arthur Tansley Ecological succession – Henry Chandler Cowles Animal Ecology - Charles Elton G. Evelyn Hutchinson - father of modern ecology 20th century transition to modern ecology
	Ecological Influence on the Social Sciences and Humanities	Human ecology History and relationship between ecology and conservation and environmental movements
	Modern nature management	Modern nature management and the development of ecological science. Sustainability theory.

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>Industrial nature management and economics</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction to the industrial nature management	Concept of nature management. Evolution and features of the industrial nature management. Modern problems of nature management in the industrial sector of the economy. Modern tendencies
2.	Sectoral problems of industrial nature management	Problems of industrial nature management in mining industry. Problems of industrial nature management in fuel and energy complex Problems of industrial nature management in chemical industry. Problems of industrial nature management in the transport industry
3	Environmental and economic consequences of sectoral problems of industrial nature management	Concept of the environmental damage. Approaches to the calculation of damages in different sectors of economy. Evaluation of natural environmental damage and its economic equivalents. Environmental damage calculation as a base for the evaluation of economic efficiency of nature protection
4	Best available technologies in the industrial nature management	Concept of BATs. Development of the system of regulation in the industrial nature management. Actual European experience and national features of BAT standardization
	Economic efficiency of environmental protection projects	Basics of economic assessment of the efficiency of environmental protection projects. Components of the environmental and economic efficiency and their calculation.

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>Industrial safety</i>
Course Workload		3 ECTS (108 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction to Industrial Safety. Hazardous production facilities. Threats to industrial safety: accidents and emergencies.	Industrial safety concept. Russian legislation in the field of industrial safety. Relevance of industrial safety issues. Understanding of hazardous production facilities, their functioning and identification methods. Regulation of hazardous production facilities. International cooperation and foreign experience in industrial safety management. International documents in the field of industrial safety management. International organizations. Russia's commitments
2.	State regulation in the field of industrial safety. Critical objects of the economy. International cooperation and foreign experience in industrial safety management	State bodies for ensuring industrial safety. Their functions and powers. Industrial safety management methods. Critical objects of the economy: methods of their identification and methods of ensuring their functioning. Normative base. Security techniques
3	Industrial safety risks. Emergency events and procedures for their investigation Software for risk analysis at hazardous production facilities	Understanding the risks and dangers. Risk identification and management methods. Industrial safety insurance. Software for risk analysis at hazardous production facilities. Information Systems. Software complexes. Domestic and foreign practice
4	Planning and prevention of emergency situations at chemically hazardous facilities Planning and prevention of emergencies with oil spills	Planning and prevention of emergency situations at chemically hazardous facilities in Russia. PLAS formation: main sections, the order of their filling; procedures for approval and implementation of the plan. Russian and foreign practice. Planning and prevention of emergencies with oil spills. Formation of OSRP: main sections, the order of their filling; procedures for approval and implementation of the plan. Major planning mistakes. Russian and foreign practice
5	Industrial safety declaration and examination of	Industrial safety declaration for hazardous industrial facilities. Industrial safety expertise. Normative base.

	hazardous industrial facilities	Emergency events and procedures for their investigation. Normative base. Practical examples of accident investigation procedures
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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>International collaboration</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction	General ideas about the necessity and methods of implementing international cooperation in the field of nature protection Absolute dependence of man on flora and fauna. The biosphere as a human habitat that has no state borders. The necessity and contradictory nature of international cooperation in the protection and rational use of flora and fauna. The main forms of international cooperation in the field of environmental protection and nature management. International cooperation in the field of wildlife protection and nature management, as a compromise of nature management. The main mechanisms of international cooperation.
2.	Examples of the implementation of international cooperation	Examples of the implementation of international cooperation in the field of nature protection on the example of the main global conventions. Rio Declaration on Environment and Development. The UN Framework Convention on Climate Change. The UN Convention on Biological Diversity. The Kyoto Protocol as an implementation of the UN Framework Convention on Climate Change. UNESCO, United Nations Educational, Scientific and Cultural Organization. UNESCO Program "Man and the Biosphere" (MAB). The Rome Convention. International trade in endangered species of wild fauna and flora as one of the main factors in reducing species diversity. plants and animals on planet Earth (CITES Convention). Berne Convention.
3	International non-governmental	International non-governmental environmental organizations and their role in international cooperation in

	environmental organizations	the field of OS protection International Whaling Commission (IWC). International Union for Conservation of Nature (IUCN). World Wildlife Fund (WWF)
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Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>IT in ecology and nature management</i>
Course Workload		3 ECTS (108 academic hours)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction. Application of computer technologies in the work of an ecologist	Computational methods for assessing environmental impact, risk assessment, etc. Application of computer tools (Excel) for economic and environmental calculations. Specialized programs for complex calculations for environmental impact assessment, risk analysis. Graphics processing software
2.	Primary processing of statistical data in Excel	Distribution characteristics, their interpretation and methods of finding them in a given sample. Compilation of interval series and determination of characteristics for a series. Visualization of statistical data
3	Assessment of the characteristics of the general population. Observation errors	Observation errors and confidence intervals for characteristics of large and small samples. Determination of the required sample size
4	Testing statistical hypotheses	Statistical hypotheses and their application to solving real problems. Parametric criteria and conditions for their application. Testing the hypothesis about the distribution law. Comparison of two samples by mean value and comparison of variances of two samples using parametric tests. Nonparametric tests. Computing consistent ranks. Comparison of two samples by the mean and comparison of variances of two samples using nonparametric tests. Data consistency assessment.
5	ANOVA	Comparison of averages in more than two objects. Analysis of variance. Nonparametric ANOVA
	Correlation-regression analysis	Statistical connection and methods of its study. Correlation coefficient: graphical assessment, Pearson, Spearman, Kendall coefficients. Linear regression analysis. Pairwise linear regression. Multiple Linear Regression. Non-linear regression models. Correlation ratio
	Time series analysis	Dynamic (time) series, their classification, structure, tasks and conditions of study.

		Indicators of the analysis of the series of dynamics. Time series trend analysis. Making forecasts. Revealing seasonal irregularities in time series
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Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>History and methodology of ecology and natural resources management</i>
Course Workload		6 ECTS (216 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Translation of scientific literature in the specialty. Scientific style of natural science disciplines in Russian and the studied foreign language	Interferences in scientific speech at the level of translation. Translation of scientific terms, units of measurement, formulas, graphs, proper names, geographical names, names of organizations. Ways to achieve adequacy and equivalence in the translation of scientific literature. Work with dictionaries and reference books. The use of computer technology in translation
2.	Annotating, summarizing and compiling reviews. Primary and secondary texts	Fundamentals of scientific text compression. Conventions and strategies for creating secondary texts of varying degrees of compression: abstracts, annotations, analytical reviews of foreign-language scientific literature in the specialty
3	Writing and presentation of scientific work in the specialty. Scientific text	Definition of scientific text. Types of scientific texts, their structure, paragraphing, division into paragraphs. Stratification of scientific literature vocabulary. Term classes. Features of functioning in scientific texts of categories of parts of speech of a foreign language in comparison with Russian. Features of punctuation. Means of communication of the text, expressing the sequence of thoughts, explanation, clarification or argumentation of thought; adversarial-restrictive relations; final value. Unions and compound turns and their corresponding unions in the Russian language. Syntax of scientific speech. Preparation of written works. Rules for citing, designing footnotes, rules for compiling a bibliography. Scientific message.

		Scientific article: principles of writing and presentation. Master's research work. Rules for construction, writing and presentation
4	Business communication.	Norms of etiquette of oral business communication. Situations of oral business communication: meetings, negotiations, reception of delegations, conversation with clients, telephone conversations. Etiquette in business correspondence. Phraseology in the language of written professional and business communication, speech patterns, clichés, politeness formulas. Types of business letters, documents. Business communication on the phone.

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*Federal State Autonomous Educational Institution for Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
(RUDN University)*

Institute of Environmental Engineering

COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

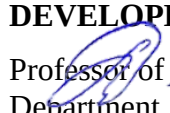
Higher education program

Economics of natural resources management

Course title		<i>Management of environmental-economic risks</i>
Course Workload		3 ECTS (108 ac.h.)
<i>Course modules and contents</i>		
№	Course modules	Contents
1.	Introduction	The concept of environmental risks. Enterprise risks and their assessment. Project risks, their minimization and the need to take into account in the analysis of the sustainability of investment projects
2.	Analysis and assessment of risk	Environmental and economic risks and methods of their analysis and assessment. Risk identification. Risk factors. Economic characteristics of environmental risks
3	Environmental risk and environmental projects	Environmental and industrial safety risks in investment projects. Climatic risks.
4	Management of risks in nature management	Management of risks. Environmental insurance. Minimization of environmental risks for the sustainable operation of enterprises
5	Minimization of environmental risks	Minimization of environmental risks and implementation of environmental management systems

The program is compiled in accordance with the requirements of the educational standard of higher education of the RUDN

DEVELOPER:


Professor of the ESandPQM
Department

Должность, БУП

Redina M.M.

Фамилия И.О.

HEAD OF THE DEPARTMENT:

Director of the ESandPQM
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Подпись

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Фамилия И.О.

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program
Economics of natural resources management

Course title		<i>Management of energy resources</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№	Course modules	Contents
1.	Introduction	Sustainable energy development as a base of the global sustainability. Sustainable development goals and trajectory of the energy sector. Global strategies
2.	Energy resources: basic assessments	Energy resources: distribution of different energy sources, availability and sustainability issues. Energy poverty as a global challenge. Global tendencies
3	Energy security and energy efficiency:	Levels of evaluation, models, management instruments. State regulation and social initiatives. Energy management. "Green standards". Best practices.
4	Green energy.	Energy sector as a source of environmental damages. Models and assessments. Green vs renewable energy
5	Management of the environmental risk in energy sector	Concept of environmental risk. Environmental risk of energy sources: renewables and non-renewables. Environmental damages and risk management: main approaches. Energy management. Waste as the "secondary resources": recycling and "waste to energy" technologies
6	Energy sector and the global climate policy	Greenhouse gases emissions: modern assessments and scenarios. Standards for the emissions. International collaboration

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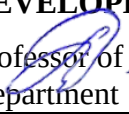
Higher education program

Economics of natural resources management

Course title		<i>Management of natural resources</i>
Course Workload		3 ECTS (108 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Introduction to natural resources management	Theoretical basics of natural resources management.
2.	Assessment of the resource base of nature management	Systems of nature use and management: structure, descriptions, management
3	State management of natural resources	State regulation of natural resources management. International practice. Efficiency and problems of the state regulation
4	Methods of natural resources management	Administrative, economic and informational approaches and their combination. International practice.
5	"Green economy" and tools for its regulation	Concept of "green economy". Modern problems of the waste in industry and household and their regulation in the "Green economy" strategy

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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>Methodology of scientific creation</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№	Course modules	Contents
1.	Concept of science	Concept of Science. 1.2. The big fields of the Science. 1.3. Divisions and branches of the sciences. 1.4 Basic Sciences. 1.5 Applied Sciences
2.	Development of the Science across the time	2.1. Historical - scientific frame. 2.2. The Genesis of the scientific thought. 2.3. Types prescientific of knowledge. 2.4. Rational speculation and origin of the natural science
3	The scientific method	3.1. Methods of the Science: analysis and synthesis, induction and deduction. 3.2. Characteristics and limitations of the scientific method. 3.3. Formal systems, models and interdisciplinary knowledge
4	Information	4.1. Quality & quantity features, 4.2. Classification of information. 4.3. Categories of articles in scientific journals. 4.4. Bradford's law. 4.5. Duplication of researches. 4.6. Subsequent steps of a literature search. 4.7. Key Words. 4.8. Relevant and pertinent documents. 4.9. Types of search with searching machines
5	Introduction to the research; Variables	5.1. Independent, dependent & confounding variables. 5.2. Choosing the Measurement. 5.3. Types of validity. 5.4. Reliability. 5.5. Sampling Groups to Study
6	Creating the Design of research	6.1. Qualitative versus Quantitative. 6.2. Empirical methods 6.3. Observation. 6.4. Experiment
7	The observation as a source of the science	7.1. The observation and the empirical science. 7.2. Features of scientific observation. 7.3. Intersubjectivity and objectivity. 7.4. Can an Observation Be Wrong? 7.5. Repeatability. 7.6. Types of observations. 7.7. Design a system for data collection. 7.8. Disadvantages of observation
8	Diffusion of reports and works of research	8.1. Scientific spreading (divulgarion) and specialized means. 8.2. Criteria of choice of the way of diffusion. 8.3. Scientific magazines. 8.4. Quality indicators. 8.5. Advance of a publication of research in poster
9	Experiments	Typical Designs and Features in Experimental Design.

		9.2. Central Tendency and Normal Distribution. 9.3. Calculating Experimental Errors. 9.4. Probability and Statistics. 9.5. Mean and Standard Deviation. 9.6. Reporting the Results of an Experimental Measurement. 9.5.Current contents and limitations
10	Research, development and scientific innovation	10.1. Concept. 10.2. Big inventions and inventors. 10.3. Development. 10.4. Innovation. 10.5. Patents. 10.6.Economic aspects
11	Social responsibility of the scientist	11.1. Responsibility in the application of the scientific method. 11.2. Scientific fraud. 11.3. The scientist likeconductive force of the progress of the knowledge
12	Studies of postdegree and centers of research	12.1. Project curricular. 12.2. Studies of degree. 12.3. Postdegree. 12.4. Doctorate. 12.5. National andInternational Centers of Research

The program is compiled in accordance with the requirements of the educational standard of higher education of the RUDN

DEVELOPER:

Docent of the Rational Nature
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COURSE DESCRIPTION

Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>Management of water resources</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№	Course modules	Contents
1.	Introduction	Specific features of water resources. Biospheric functions and current problems. Water resources: distribution of different energy sources, availability and sustainability issues. Energy poverty as a global challenge. Global tendencies
2.	Water resources: basic assessments	Quality of water resources: quantitative and qualitative assessments. Main requirements. Global tendencies
3	Water strategies	Global strategies: SDG and international collaboration. International standards. Global and regional water policy.
4	Economic assessment of water resources	Main methods. Factors of economic evaluation. International practice
5	Water management	Water uses: agriculture and other irrigation; industries; drinking water and domestic use (households); environmental consequences. Sustainable water management. Managing water in urban settings

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Higher Education Field 05.04.06 Ecology and nature management

Higher education program
Economics of natural resources management

Course title		<i>Modern problems of ecology</i>
Course Workload		3 ECTS (108 ac.h.)
<i>Course modules and contents</i>		
№	Course modules	Contents
1.	Introduction	Ecology as a complex science direction. Stages of the development of the ecological knowledge and science. System of the ecological disciplines. Ecology and nature management. Ecology and sustainability
2.	Concept of the nature (use) management	Main directions and types of nature management. Laws and rules in ecology. Modern ecological problems of nature management: environmental consequences of gaps in nature management.
3	Human ecology	Stages of human development as a biological species. Dependence on natural conditions and factors. Periods of the noosphere development
4	Crises in the history of mankind	Crises in the historical development: sources and consequences. Modern stage of the development: difficulties in the functioning of ecosystems. Demographic crisis. Social crisis. Energy crisis
5	Strategies for overcoming the environmental crisis	Sustainable development strategies and goals. Solving environmental and social problems. Solving the problems of resource availability. Modern ecological research.

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Higher Education Field 05.04.06 Ecology and nature management

Higher education program

Economics of natural resources management

Course title		<i>Modern remediation technologies</i>
Course Workload		2 ECTS (72 ac.h.)
<i>Course modules and contents</i>		
№ п/п	Course modules	Contents
1.	Remediation technologies: main tasks and characteristics; classification	Remediation technologies: main tasks and characteristics; classification: physical methods; chemical methods; biological methods; in situ and ex situ technologies
2.	Soil remediation technologies	Soil remediation technologies: practical examples, efficiency, standards. Efficiency and risks
3	Remediation of wastewater	Remediation of wastewater: practical examples, efficiency, standards. Efficiency and risks
4	Remediation of waste landfills	Remediation of waste landfills: practical examples, efficiency, standards. Efficiency and risks

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