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

Institute of Environmental Engineering
(наименование основного учебного подразделения (ОУП)-разработчика ОП ВО)

COURSE SYLLABUS

Management of energy resources
(наименование дисциплины/модуля)

Recommended by the Methodological Council for the Education Field:

05.04.06 Ecology and nature management
(код и наименование направления подготовки/специальности)

The discipline is mastered within the framework of the main professional higher education program:

Economics of natural resources management
(наименование (профиль/специализация) ОП ВО)

2022

1. COURSE GOALS

The purpose of the discipline is to get acquainted with current state of the energy sector development, environmental and resource problems and strategies of their elimination. Also the climate protection issues are included into this course in a part of estimation of a carbon footprint of energy sector objects. .

2. LEARNING OUTCOMES

The mastering of the discipline "Management of energy resources" is aimed at the formation of the following competencies (parts of competencies) in students:

Table 2.1. List of competencies formed by students during the development of the discipline (LEARNING OUTCOMES)

Code	Competence	Indicators of competence achievement (within the framework of this discipline)
GC -2	able to manage the project at all stages of its life cycle.	**GC -2.1** able to formulate a project task based on the problem posed and the way to solve it
		GC-2.2 able to develop a project concept, formulates a goal, tasks, justifies the relevance, expected results and scope of their application
		GC-2.3 knows how to develop a project implementation plan taking into account possible risks, plans the necessary resources
GC-6	Able to determine and implement the priorities of his own activities and ways to improve it based on self-assessment.	**GC-6.1** able to assess his resources and their limits (personal, situational, temporary), makes reasonable use of them
		GC-6.2 able to identify educational needs and ways to improve their own (including professional) activities based on self-assessment
		GC-6.3 has the skills to build a flexible professional trajectory, taking into account the accumulated experience of professional activity, dynamically changing requirements of the labor market and personal development strategy
GPC-3	Able to apply environmental research methods to solve research and applied problems of professional activity	**GPC -3.1** Knows the principles and methods of environmental monitoring of environmental components
		GPC -3.2 Owns analytical methods for monitoring pollutants and physical impacts and processing the information received
		GPC -3.3 Able to develop systems for environmental monitoring and control in production and solve applied problems in professional activities
SPC -3	Possession of the basics of design, expert-analytical activities and research using modern approaches and methods, equipment and computer systems	SPC-3.1 Able to plan the introduction of modern approaches and methods, equipment and computing systems to solve problems in the professional field
		PC-3.2 Owns the basics of design and expert-analytical activities
		SPC-5.2. Has the skills to assess the impact of planned structures or other forms of economic activity on the environment

Code	Competence	Indicators of competence achievement (within the framework of this discipline)
		SPC-5.3 Knows the requirements for the preparation and implementation of programs for the environmental modernization of enterprises, the introduction of BAT, the organization of environmental monitoring, accounting and reporting
SPC-6	Able to develop standard environmental measures and assess the impact of planned facilities or other forms of economic activity on the environment	**SPC-6.1** Capable of detecting inconsistencies in the state of environmental components with the requirements of national and international standards
		SPC-6.2 Able to develop programs for monitoring natural complexes under conditions of technogenic loads and programs for environmental rehabilitation of territories

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline "Management of energy resources" refers to Compulsory Disciplines of the Higher Education Program.

Within the framework of the higher education program, students also master other disciplines and/or practices that contribute to expected learning outcomes of the discipline "Management of energy resources".

Table 3.1. List of Higher Education Program components that contribute to expected learning outcomes

Code	Competence	Previous Disciplines (Modules)	Subsequent Disciplines (Modules)
GC -2	able to manage the project at all stages of its life cycle.	Management of environmental-economic risks / Управление эколого-экономическими рисками Management of natural resources / Менеджмент природных ресурсов Industrial nature management and economics / Промышленное природопользование и экономика Modern remediation technologies / Современные технологии ремедиации Management of energy resources / Менеджмент ресурсов энергетики Учебная практика / Educational practice Научно-исследовательская работа / Research work	Производственная практика / Production practice НИР / Research work Преддипломная практика / Pre-graduate practice

Code	Competence	Previous Disciplines (Modules)	Subsequent Disciplines (Modules)
GC -6	Able to determine and implement the priorities of his own activities and ways to improve it based on self-assessment.	Philosophical problems of natural sciences / Философские проблемы естествознания Вариативная компонента Management of energy resources / Менеджмент ресурсов энергетики Учебная практика / Educational practice Научно-исследовательская работа / Research work	Производственная практика / Production practice НИР / Research work
GPC-3	Able to apply environmental research methods to solve research and applied problems of professional activity	Estimations of natural resources / Оценки природных ресурсов Economic aspects of natural resources management / Экономические аспекты природопользования Management of water resources / Управление водными ресурсами Environmental-economic aspects of environmental projects / Эколого-экономические аспекты экологических проектов Environmental norms for sustainability / Экологические нормы для устойчивого развития Standards of environmental management and occupational safety / Стандарты экологического менеджмента и охраны труда Occupational safety and HSE-audit / Охрана труда и HSE-аудит Wastes: Landfills, Processing and Recycling / Отходы: хранение, захоронение, рециклинг	Modern technologies for nature protection / Современные технологии защиты окружающей среды Modern remediation technologies / Современные технологии ремедиации Surface water quality: modeling and management / Качество поверхностных вод: моделирование и менеджмент Учебная практика / Educational practice Производственная практика / Production practice
SPC -3	Possession of the basics of design, expert-analytical activities and research using modern approaches and methods, equipment and computer systems	Estimations of natural resources / Оценки природных ресурсов Modern technologies for nature protection / Современные технологии защиты окружающей среды Modern remediation technologies / Современные технологии ремедиации Economic aspects of natural resources management / Экономические аспекты природопользования	Производственная практика / Production practice НИР / Research work Преддипломная практика / Pre-graduate practice

Code	Competence	Previous Disciplines (Modules)	Subsequent Disciplines (Modules)
		Management of energy resources / Менеджмент ресурсов энергетики Environmental noms for sustainability / Экологические нормы для устойчивого развития Engineering ecology / Инженерная экология Monitoring of environmental impacts / Мониторинг экологических воздействий Базовая компонента Учебная практика / Educational practice Научно-исследовательская работа / Research work	
SPC-6	Able to develop standard environmental measures and assess the impact of planned facilities or other forms of economic activity on the environment	Management of natural resources / Менеджмент природных ресурсов Modern technologies for nature protection / Современные технологии защиты окружающей среды Industrial nature management and economics / Промышленное природопользование и экономика Economic aspects of natural resources management / Экономические аспекты природопользования Standards of environmental management and occupational safety / Стандарты экологического менеджмента и охраны труда Occupational safety and HSE-audit / Охрана труда и HSE-аудит Environmental norms for sustainability / Экологические нормы для устойчивого развития Environmental statistics / Экологическая статистика Environmental accounting and reporting / Экологический учет и отчетность Wastes: Landfills, Processing and Recycling / Отходы: хранение, захоронение, рециклинг	Производственная практика / Production practice Научно-исследовательская работа / Research work НИР / Research work Преддипломная практика / Pre-graduate practice

Code	Competence	Previous Disciplines (Modules)	Subsequent Disciplines (Modules)
		Surface water quality: modeling and management / Качество поверхностных вод: моделирование и менеджмент Industrial safety / Промышленная безопасность Simulation and prevention of accidents / Моделирование и предупреждение аварий Учебная практика / Educational practice	

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

Workload of the course «Management of energy resources» is 2 ECTS.

Table 4.1. Types of academic activities during the period of the HE program mastering

Вид учебной работы		**TOTAL**	**Semesters**			
			1	**2**	**3**	**4**
Contact academic hours		*17*			*17*	
Incl.:						
Lectures						
Lab work						
Seminars		17			17	
Self-study		*43*			*43*	
Evaluation and assessment		*12*			*12*	
Total workload	Ac.hours	**72**			**72**	
	ECTS	**2**			**2**	

5. COURSE CONTENTS

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

Name of the discipline section	**Content of the section (topics)**	**Type of academic activity***
Introduction	Sustainable energy development as a base of the global sustainability. Sustainable development goals and trajectory of the energy sector. Global strategies	Seminars
Energy resources: basic assessments	Energy resources: distribution of different energy sources, availability and sustainability issues. Energy poverty as a global challenge. Global tendencies	Seminars
Energy security and energy efficiency:	Levels of evaluation, models, management instruments. State regulation and social initiatives. Energy management. “Green standards”. Best practices.	Seminars

Green energy.	Energy sector as a source of environmental damages. Models and assessments. Green vs renewable energy	Seminars
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	Seminars
Energy sector and the global climate policy	Greenhouse gases emissions: modern assessments and scenarios. Standards for the emissions. International collaboration	Seminars

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Classroom for Academic Activity Type	CLASSROOM EQUIPMENT	Specialized learning, laboratory equipment, software and materials for the mastering the course
Seminars	Classroom, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector, laptop, projection screen, Stable wireless Internet connection. Software: Microsoft Windows, MS Office / Office 365, MS Teams, Chrome (latest stable release), Skype	-
Self-studies	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to an electronic information and educational environment.	-

7. RECOMMENDED SOURCES FOR COURSE STUDIES

- *Main reading:*

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DEVELOPMENT AND INTERNATIONAL ECONOMIC CO-OPERATION: ENVIRONMENT. Report of the World Commission on Environment and Development. URL: http://upload.wikimedia.org/wikisource/en/d/d7/Our-common-future.pdf

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Internet-sources:

1. Electronic library system of the RUDN and third-party electronic library systems, to which university students have access on the basis of concluded contracts:

- electronic library system of the RUDN University http://lib.rudn.ru/MegaPro/Web

- electronic library system «Университетская библиотека онлайн» http://www.biblioclub.ru
- electronic library system Юрайт http://www.biblio-online.ru
- electronic library system «Консультант студента» www.studentlibrary.ru
- electronic library system «Лань» http://e.lanbook.com/
- electronic library system «Троицкий мост»

2. Databases and search engines:
- electronic fund of legal and regulatory and technical documentation http://docs.cntd.ru/
- Yandex search engine https://www.yandex.ru/
- Google search engine https://www.google.ru/
- abstract database SCOPUS http://www.elsevierscience.ru/products/scopus/
- ……..

*Educational and methodological materials for independent work of students during the development of the discipline/ module *:*

1. A course of lectures on the discipline " Management of energy resources ".

* - all educational and methodological materials for independent work of students are placed in accordance with the current procedure on the discipline page in the Telecommunication educational and Information System!

8. MID-TERM ASSESSMENT AND EVALUATION TOOLKIT

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

* - evaluation toolkit and ranking system are formed on the basis of the requirements of the relevant local regulatory act of the RUDN (regulations / order).

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