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PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA NAMED AFTER PATRICE LUMUMBA

Institute of Environmental Engineering

(наименование основного учебного подразделения (ОУП)-разработчика ОП ВО)

COURSE SYLLABUS

Management of water 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)

2025

1. COURSE GOALS

The purpose of the discipline is to get acquainted with modern international standards on environmental management, first of all the ISO 14000 group. In the course there will be considered stages of the development and implementation of standards, practical steps on the support of the regulatory system in the organization in order to achieve environmental improvements and regulate the environmental protection issues.

2. LEARNING OUTCOMES

The mastering of the discipline "Management of water 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)
GPC-2	Able to use special and new sections of ecology, geoecology and nature management in solving research and applied problems of professional activity.	**GPC -2.1** Knows the basics of ecology, geoecology, environmental economics and circular economy, as well as environmental management
		GPC -2.2 Able to use environmental, economic and other special knowledge and algorithms to solve professional problems
		GPC -2.3 Able to find, analyze and competently use the latest information and modern techniques in the performance of research and applied tasks
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-5	Able to develop standard environmental measures and assess the impact of planned facilities or other forms of economic activity on the environment	SPC-5.1 Able to develop and plan the implementation of standard environmental measures, taking into account international practice and the requirements of national legislation
		SPC-5.2. Has the skills to assess the impact of planned structures or other forms of economic activity on the environment
		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

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline "Management of water 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 water resources ".

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

Code	**Competence**	Previous Disciplines (Modules)	Subsequent Disciplines (Modules)
GPC -2	Able to use special and new sections of ecology, geoecology and nature management in solving research and applied problems of professional activity..		
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 energy resources / Менеджмент ресурсов энергетики Environmental-economic aspects of environmental projects / Эколого-экономические аспекты экологических проектов 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 Surface water quality: modeling and management / Качество поверхностных вод: моделирование и менеджмент	Modern technologies for nature protection / Современные технологии защиты окружающей среды Modern remediation technologies / Современные технологии ремедиации Environmental noms for sustainability / Экологические нормы для устойчивого развития 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)
		Учебная практика / Educational practice	
SPC-5	Able to develop standard environmental measures and assess the impact of planned facilities or other forms of economic activity on the environment	Estimations of natural resources / Оценки природных ресурсов Management of environmental-economic risks / Управление эколого-экономическими рисками Environmental standards and nature management / Экологические стандарты и природопользование Modern remediation technologies / Современные технологии ремедиации Environmental-economic aspects of environmental projects / Эколого-экономические аспекты экологических проектов Environmental statistics / Экологическая статистика Environmental accounting and reporting / Экологический учет и отчетность Wastes: Landfills, Processing and Recycling / Отходы: хранение, захоронение, рециклинг Учебная практика / Educational practice	Surface water quality: modeling and management / Качество поверхностных вод: моделирование и менеджмент Производственная практика / Production practice Научно-исследовательская работа / Research work НИР / Research work Преддипломная практика / Pre-graduate practice

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

Workload of the course « Management of water 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	*34*				
Incl.:					
Lectures	17		17		
Lab work					
Seminars	17		17		
Self-study	*25*		*25*		
Evaluation and assessment	*13*		*13*		

Вид учебной работы		TOTAL	Semesters			
			1	2	3	4
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	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	Lectures, Seminars
Water resources: basic assessments	Quality of water resources: quantitative and qualitative assessments. Main requirements. Global tendencies	Lectures, Seminars
Water strategies	Global strategies: SDG and international collaboration. International standards. Global and regional water policy.	Lectures, Seminars
Economic assessment of water resources	Main methods. Factors of economic evaluation. Internationalpratice	Lectures, Seminars
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	Lectures, 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
Lecture	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical means of multimedia presentations.	-
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	-

Classroom for Academic Activity Type	CLASSROOM EQUIPMENT	Specialized learning, laboratory equipment, software and materials for the mastering the course
	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:*

Schmutz S., Sendzimir J. Riverine ecosystem management: Science for governing towards a sustainable future. – Springer Nature, 2018..

Additional sources:

1. Šulyová D., Vodák J., Kubina M. Effective Management of Scarce Water Resources: From Antiquity to Today and into the Future //Water. – 2021. – Т. 13. – №. 19. – С. 2734.

2. Wang K., Davies E. G. R., Liu J. Integrated water resources management and modeling: A case study of Bow river basin, Canada //Journal of Cleaner Production. – 2019. – Т. 240. – С. 118242.

3. Simonovic S. P. Systems approach to management of water resources—Toward performance based water resources engineering //Water. – 2020. – Т. 12. – №. 4. – С. 1208.

4. Holden J. (ed.). Water resources: an integrated approach. – Routledge, 2019.

5.Mays L.W. Water Resources Engineering. Wiley, 2011, 92 0pp.

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 water 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 water 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).

DEVELOPER:

Professor-consultant of the ESandPQM Department		**Khaustov A.P.**
Position, Department	Signature	Name

HEAD OF THE DEPARTMENT:

Head of the Department of Environmental Safety and Product Quality Management		**Savenkova E.V.**
Department	Signature	Name

HAED OF THE HIGHER EDUCATION PROGRAM:

Professor of the Department of Environmental Safety and Product Quality Management		**Redina M.M.**
Position, Department	Signature	Name