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Federal State Autonomous Educational Institution for Higher Education PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA (RUDN University) named after Patrice Lumumba Institute of Environmental Engineering

**INTERNSHIP SYLLABUS
Industrial Internship**

(internship title)
industrial

(internship type)

**Recommended by the Didactic Council for the Education Field of:
05.04.06 "Ecology and Nature Management"**

**The student's internship is implemented within the professional education programme of higher education:
«Integrated Solid Waste Management»**

2024

1. INTERNSHIP GOAL(s)

The goal of the "Industrial Internship" is to systematize the received theoretical and practical knowledge in the special disciplines of the educational programme «Integrated Solid Waste Management». In addition, it was design to help students to apply the knowledge and skills in solving specific problems of professional activity at the modern level.

2. REQUIREMENTS FOR LEARNING OUTCOMES

The internship is designed for students to acquire following competences (competences in part):

Table 2.1. List of competences that students acquire during the internship

Code and descriptor of generic competence	Code and competence level indicator
GC-1. Able to carry out a problem situations critical analysis based on a systematic approach, to develop an action strategy.	GC-1.1 can analyze the problem situation as a system, identifying its components and the links between them
	GC-1.2 owns argumentation and develops a meaningful strategy for solving a problem situation based on a systematic and interdisciplinary approach
	GC-1.3 knows the basics strategies and identifies possible risks, suggesting ways to eliminate them
GC-2. Able to manage a project at all stages of its life cycle.	GC-2.1 can formulate a project task based on the problem posed and a way to solve it
	GC-2.2 capable to develop the concept of the project, formulate the goal, objectives, justify the relevance, expected results and scope of their application
	GC-2.3 can develop a project implementation plan taking into account possible risks, plans the necessary resources
GC-3. Able to organize and manage the team work, developing a team strategy to achieve the goal.	GC -3.1 owns the techniques and methods of teamwork, organizes the selection of team members to achieve the goal;
	GC -3.2 capable to organize and adjust the work of the team, including on the basis of collegial decisions

	GC-3.3 can delegate authority to team members and distribute assignments, give feedback on the results, take responsibility for the overall result
GC-4. Able to apply modern communication technologies, including foreign language(s) for academic and professional interaction	GC -4.1 can establish contacts and organize communication in accordance with the needs of joint activities, using modern communication technologies
	GC-4.2 knows the basics of business documentation and uses professional vocabulary in foreign and Russian languages
	GC-4.3 capable to organize a results discussion and present the results of research and project activities at various public events in Russian or a foreign language, choosing the most appropriate format.
GC-6. Able to identify and implement the priorities of their own activities and ways to improve it based on self-esteem.	GC-6.1 can evaluate resources and their limits (personal, situational, temporary), use them appropriately
	GC-6.2 capable to determine educational needs and ways to improve their own (including professional) activities based on self-assessment
	GC -6.3 owns skills building a flexible professional trajectory, taking into account the accumulated experience of professional activity, dynamically changing labor market requirements and personal development strategies
GPC-1. Able to use philosophical concepts and methodology of scientific creation in the study of various levels of matter, space and time organization.	GPC-1.1 Knows the philosophical concepts of natural science and methodology of scientific creation
	GPC-1.2 Able to use in-depth knowledge in the philosophical concepts of natural science in assessing the professional activities consequences
	GPC-1.3 Able to apply the acquired knowledge in the research activities, to make correct generalizations and conclusions
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 Capable of finding, analyzing and competently using latest information and modern techniques in the research and applied tasks performance
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 related with different environmental components
	GPC-3.2 Owns analytical methods of pollutants control, physical impacts and processing of the received information
	GPC-3.3 Able to develop environmental monitoring and control systems in production and solve applied problems in professional activities

GPC-4. Able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management.	GPC-4.1 Knows the environmental regulation and legislation basics in the field of nature management
	GPC-4.2 Knows how to use and apply regulatory legal acts in the field of ecology and nature management
	GPC-4.3 Able to use the professional ethics norms in their professional activities
GPC-5. Able to solve the problems of professional activity in the field of ecology, nature management and protection using information and communication, including geoinformation technologies.	GPC-5.1 Knows how to choose and apply algorithm for solving environmental problems and implements algorithms using software
	GPC-5.2 Has the skills to use information technology tools for searching, storing, processing, analyzing and presenting information
	GPC-5.3 Able to process earth remote sensing data and use cartographic materials, owns modern GIS technologies

GPC-6. Able to design, represent, protect and disseminate the results of their professional activities, including research.	GPC-6.1 Able to receive, analyze, summarize the necessary scientific information using modern research methods, present their own results in the form of scientific articles and public speeches
	GPC-6.2 Possesses the skills of oral report and presentation with regards to the project and scientific activities results
	GPC-6.3 Knows methodological foundations of scientific research, copyright and scientific ethics requirements
PC-2 Able to develop and economically justify plans for the introduction of new equipment and technologies to ensure minimal waste impact on the environment	PC-2.1 Has the skills to select and implement the best available technologies (BAT) for the processing and recycling of production and consumption waste
	PC-2.2 Can economically justify plans for the introduction of new equipment and technologies for waste management, using them as a secondary resource
	PC-2.3 Capable of minimizing the waste impact on the environment
PC-3 Able to develop measures for the economic regulation of the organization's environmental activities	PC-3.1 Able to predict socio-economic development based on environmental forecasts
	PC-3.2 Knows how to determine the economic effect of the measures application aimed at ensuring the enterprise environmental safety
PC-5 Able to analyze the causes and minimize the consequences of the production negative impact on the environment	PC-5.1 Able to identify the causes and sources of harmful substances entering the environment and the causes and sources of solid waste generation
	PC-5.2 Has the skills to prepare proposals to eliminate the causes and eliminate the negative consequences of the impact
	PC-5.3 Ensures the plans implementation for environmental protection measures and the elimination of accumulated environmental damage objects to the environment, including the existing waste disposal sites reclamation, lands after the elimination of unauthorized dumps, etc.

3. INTERNSHIP IN HIGHER EDUCATION PROGRAMME STRUCTURE

“Industrial internship” refers to the part formed by the educational relations participants.

Within the higher education programme students also master other disciplines (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the internship.

Table 3.1. The list of the higher education programme components that contribute to the achievement of the expected learning outcomes as the internship results.

Competence code	Competence descriptor	Previous courses/modules, internships*	Subsequent courses/modules, internships*
GC-1	Able to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy	Methodology of Scientific Creation Environmental Control and MSW Monitoring Programs Physicochemical Methods of Waste Testing	Research work on thesis State Exam Degree Diploma
GC-2	Able to manage a project at all stages of its life cycle	IT in Ecology and Natural Resources Management Methodology of Scientific Creation	Research work on thesis State Exam Degree Diploma
GC-3	Able to organize and manage the work of the team, developing a team strategy to achieve the goal	Foreign Language International Cooperation in the field of Nature Protection Methodology of Scientific Creation Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools Regional & Municipal MSW Management Systems	Research work on thesis State Exam Degree Diploma
GC-4	Able to apply modern communication technologies, including in foreign language(s), for academic and professional interaction	Higher School Pedagogy	Research work on thesis State Exam Degree Diploma
GC-6	Able to determine and implement the priorities of their own activities and ways to improve it based on self-assessment	Methodology of Scientific Creation Environmental Control and MSW Monitoring Programs Physicochemical Methods of Waste Testing	Research work on thesis State Exam Degree Diploma

SPC-1	Able to use philosophical concepts and methodology of scientific knowledge in the study of various levels of organization of matter, space and time	MSW Recycling and Utilization Technics	Research work on thesis State Exam Degree Diploma
SPC-2	Able to use special and new sections of ecology, geoecology and nature management in solving research and applied problems of professional activity	MSW Recycling and Utilization Technics geochemical aspects of waste impact Regional & Municipal MSW Management Systems Basics of Circular	Research work on thesis State Exam Degree Diploma

		Green Economy and Tools for Enterprises Sustainable Development	
SPC-3	Able to apply environmental research methods to solve research and applied problems of professional activity	Biological and Waste Sanitary Safety Mapping and GIS Technologies in MSW Management Environmental Control and MSW Monitoring Programs Physicochemical Methods of Waste Testing	Research work on thesis State Exam Degree Diploma
SPC-4	Able to apply regulatory legal acts in the field of ecology and nature management, norms of professional ethics	Nature Protection and Accumulated Environmental Damage (AED) Elimination Tools National And International Aspects Of Radioactive Waste Management Environmental Control and MSW Monitoring Programs Physicochemical Methods of Waste Testing	Research work on thesis State Exam Degree Diploma

SPC-5	Able to solve the problems of professional activity in the field of ecology, nature management and nature protection using information and communication, including geoinformation technologies	IT in ecology and Natural Resources Management International Cooperation in the field of Nature Protection Landscape and Geochemical Aspects of Waste Impact Ecotoxicokinetics of Waste National and International Aspects of Radioactive Waste Management Regional & Municipal MSW Management Systems Biological and Sanitary Waste Safety Mapping and GIS technologies in MSW	Research work on thesis State Exam Degree Diploma
SPC-6	Able to design, represent, protect and disseminate the results of their professional activities, including research	Research Work Including Projects	Research work on thesis State Exam Degree Diploma
PC-2	the ability to creatively use in scientific and industrial and technological activities the knowledge of fundamental and applied sections of special disciplines of the master's program	MSW Recycling and Utilization Technics	Research work on thesis State Exam Degree Diploma
PC-3	possession of the basics of design, expertanalytical activities and research using modern approaches and methods, equipment and computer systems	Geochemical Aspects of Waste Impact Ecotoxicokinetics of Waste National and International Aspects of Radioactive Waste Management Regional & Municipal MSW Management Systems Biological and Sanitary Waste Safety	Research work on thesis State Exam Degree Diploma
PC-5	the ability to develop standard environmental measures and assess the impact of planned structures or other forms of economic activity on the environment	Mapping and GIS Technologies in MSW Management	Research work on thesis State Exam Degree Diploma

4. INTERNSHIP WORKLOAD

The total workload of the internship is 15 credit units (540 academic hours).

5. INTERNSHIP CONTENTS

Table 5.1. Internship contents

Modules	Contents (topics, types of practical activities)	Workload, academic hours
Module 1. Preparatory stage	1.1 Registration at the enterprise. Safety briefing.	44
	1.2 General training on labor protection and internal regulations at enterprise	32
	1.3 Search, processing and storage of production information, methods choice. Filling a practice diary.	32
Module 2 Completing a practice assignment	2.1. Familiarization with the main production facilities / organizations. Filling a practice diary.	32
	2.2. Studying the organization of work at the enterprise, including receiving an assignment from the head of practice at the enterprise / in the organization.	32
Modules	Contents (topics, types of practical activities)	Workload, academic hours
	Filling a practice diary	
	2.3. The study of standards, normative-technical and reference literature used at the enterprise, normative control of energy-, resource-saving and environmental systems documents. Filling a practice diary	32
	2.4. Study of technical documentation for energy, resourcesaving and ecological systems. Filling a practice diary	40
	2.5. The study of technological processes for the manufacture of energy-, resource-saving and ecological systems. Filling a practice diary	40
	2.6. The study of technological processes for the manufacture of energy-, resource-saving and ecological systems. Filling a practice diary	40
	2.7. Proposals development for improving the technological processes in frame of energy-, resource-saving and environmental systems. Results analysis. Filling a practice diary	40
	2.8. Preparation of the work results carried out by the head of practice at the enterprise / in the organization. Filling a practice diary	24
	Preparation of the internship report	10
	Report Defense	10
	TOTAL:	540

6. INTERNSHIP EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Industrial practice for obtaining professional skills and abilities is carried out for 10 weeks, starting from the second half of April at the enterprises of Moscow and the Moscow region, which have on their balance sheet: environmental facilities for waste disposal / disposal; equipment for the neutralization or disposal of waste; operating treatment facilities.

The most frequently visited facilities include solid or industrial waste landfills and waste sorting stations; design institutes; waste incinerators, municipal and industrial wastewater treatment plants, etc.

- Places of industrial practice:
- JSC "ECOTECHNOLOGIES", Voronezh
- Moscow waste incineration plant No. 4 "Rudnevo", Moscow
- Torbeevsky landfill for municipal solid waste, Moscow region, urban district of Lyubertsy, village of Torbeevo

7. INTERNSHIP LOCATION AND TIMELINE

The internship can be carried out at the structural divisions of RUDN University (at Moscow-based organisations, as well as those located outside Moscow.

The internship at an external organisation (outside RUDN University) is legally arranged on the grounds of an appropriate agreement, which specifies the terms, place and conditions for an internship implementation at the organisation.

The period of the internship, as a rule, corresponds to the period indicated in the training calendar of the higher education programme. However, the period of the internship can be rescheduled upon the agreement with the Department of Educational Policy and the Department for the Organization of Internship and Employment of RUDN students.

8. RESOURCES RECOMMENDED FOR INTERNSHIP

Main reading:

1. Kharlamova MD, Kurbatova AI Modern Technologies of Waste Management, Recycling and Environmental Protection / Modern methods of waste management, recycling and environmental protection - M. : RUDN University, 2017. - 98 p. : ill.1. Study guide in English. language 2. Electronic text data Text/electronic resource ISBN 978-5-209-07889-0: 120.68.

Additional reading:

1. Evans Virginia., Evans, J. Dooley, K. Rodgers. Environmental Engineering Book 1, 2, 3/ V . Newbery : Express Publishing , 2013. - 38, 40, 41 p Textbook in English 1 ISBN 978-1-4715-1611-5: 1365.10.
2. Golinska Paulina. : P. Golinska , M. Fertsch . Information Technologies in Environmental Engineering 2011. Environmental Science and Engineering, ISSN 1863-5520 Monograph, ISBN 978-3-642-19535-8. Electronic text data <http://www.springerlink.com/openurl.asp?genre=book&isbn=978-3-642-19535-8>

Internet sources

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:
 - RUDN Electronic Library System (RUDN ELS) <http://lib.rudn.ru/MegaPro/Web>
 - EL "University Library Online" <http://www.biblioclub.ru>
 - EL "Yurayt" <http://www.biblio-online.ru>
 - EL "Student Consultant" www.studentlibrary.ru
 - EL "Lan" <http://e.lanbook.com/>
 - EL "Trinity Bridge"

2. *Databases and search engines:*

- electronic foundation of legal and normative-technical documentation

<http://docs.cntd.ru/>

- Yandex search engine <https://www.yandex.ru/>
- Google search engine <https://www.google.ru/>
- Scopus abstract database <http://www.elsevierscience.ru/products/scopus/>

The training toolkit and guidelines for a student to do an internship, keep an internship diary and write an internship report:*

1. Safety regulations to do the internship (safety awareness briefing).
2. Machinery and principles of operation of technological production equipment used by students during their internship; process flow charts, regulations, etc. (if necessary).
3. Guidelines for keeping an internship diary and writing an internship report.

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL AS INTERNSHIP RESULTS

The assessment toolkit and the grading system* to evaluate the level of competences (competences in part) formation as the internship results are specified in the Appendix to the internship syllabus.

DEVELOPER:

Associate Professor of the
ES&PQM Department

Popkova A.V.

Position, BUP

Signature

Name, Surname

HEAD OF EDUCATIONAL DEPARTMENT:

Director of ES&PQM Department

Savenkova E.V.

Position

Signature

Name, Surname

HEAD OF

HIGHER EDUCATION PROGRAMME:

Associate Professor of the
EM Department

Kapralova D.O.

Position

Signature

Name, Surname