

**Institute of Environmental Engineering**

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**INTERNSHIP SYLLABUS**

**Industrial Internship**

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(internship title)

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industrial  
(internship type)

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**Recommended by the Didactic Council for the Education Field of:**

05.04.06 "Ecology and Nature Management"

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**The student's internship is implemented within the professional education programme of higher education:**

«Integrated Solid Waste Management» (Network program with L.N. Gumilyov Eurasian National University)

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## 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*

<b>Code and descriptor of generic competence</b>	<b>Code and competence level indicator</b>
<b>GC-1.</b> Able to carry out a problem situations critical analysis based on a systematic approach, to develop an action strategy.	<b>GC-1.1</b> can analyze the problem situation as a system, identifying its components and the links between them
	<b>GC-1.2</b> owns argumentation and develops a meaningful strategy for solving a problem situation based on a systematic and interdisciplinary approach
	<b>GC-1.3</b> knows the basics strategies and identifies possible risks, suggesting ways to eliminate them
<b>GC-2.</b> Able to manage a project at all stages of its life cycle.	<b>GC-2.1</b> can formulate a project task based on the problem posed and a way to solve it
	<b>GC-2.2</b> capable to develop the concept of the project, formulate the goal, objectives, justify the relevance, expected results and scope of their application
	<b>GC-2.3</b> can develop a project implementation plan taking into account possible risks, plans the necessary resources
<b>GC-3.</b> Able to organize and manage the team work, developing a team strategy to achieve the goal.	<b>GC -3.1</b> owns the techniques and methods of teamwork, organizes the selection of team members to achieve the goal;
	<b>GC -3.2</b> capable to organize and adjust the work of the team, including on the basis of collegial decisions
	<b>GC-3.3</b> can delegate authority to team members and distribute assignments, give feedback on the results, take responsibility for the overall result
<b>GC-4.</b> Able to apply modern communication technologies, including foreign language(s) for academic and professional interaction	<b>GC -4.1</b> can establish contacts and organize communication in accordance with the needs of joint activities, using modern communication technologies
	<b>GC-4.2</b> knows the basics of business documentation and uses professional vocabulary in foreign and Russian languages
	<b>GC-4.3</b> 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.

<p><b>GC-6.</b> Able to identify and implement the priorities of their own activities and ways to improve it based on self-esteem.</p>	<p><b>GC-6.1</b> can evaluate resources and their limits (personal, situational, temporary), use them appropriately</p>
	<p><b>GC-6.2</b> capable to determine educational needs and ways to improve their own (including professional) activities based on self-assessment</p>
	<p><b>GC -6.3</b> 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</p>
<p><b>GPC-1.</b> Able to use philosophical concepts and methodology of scientific creation in the study of various levels of matter, space and time organization.</p>	<p><b>GPC-1.1</b> Knows the philosophical concepts of natural science and methodology of scientific creation</p>
	<p><b>GPC-1.2</b> Able to use in-depth knowledge in the philosophical concepts of natural science in assessing the professional activities consequences</p>
	<p><b>GPC-1.3</b> Able to apply the acquired knowledge in the research activities, to make correct generalizations and conclusions</p>
<p><b>GPC-2.</b> Able to use special and new sections of ecology, geoecology and nature management in solving research and applied problems of professional activity.</p>	<p><b>GPC-2.1</b> Knows the basics of ecology, geoecology, environmental economics and circular economy, as well as environmental management</p>
	<p><b>GPC-2.2</b> Able to use environmental, economic and other special knowledge and algorithms to solve professional problems</p>
	<p><b>GPC-2.3</b> Capable of finding, analyzing and competently using latest information and modern techniques in the research and applied tasks performance</p>
<p><b>GPC-3.</b> Able to apply environmental research methods to solve research and applied problems of professional activity.</p>	<p><b>GPC-3.1</b> Knows the principles and methods of environmental monitoring related with different environmental components</p>
	<p><b>GPC-3.2</b> Owns analytical methods of pollutants control, physical impacts and processing of the received information</p>
	<p><b>GPC-3.3</b> Able to develop environmental monitoring and control systems in production and solve applied problems in professional activities</p>
<p><b>GPC-4.</b> Able to apply regulatory legal acts and norms of professional ethics in the field of ecology and nature management.</p>	<p><b>GPC-4.1</b> Knows the environmental regulation and legislation basics in the field of nature management</p>
	<p><b>GPC-4.2</b> Knows how to use and apply regulatory legal acts in the field of ecology and nature management</p>
	<p><b>GPC-4.3</b> Able to use the professional ethics norms in their professional activities</p>
<p><b>GPC-5.</b> Able to solve the problems of professional activity in the field of ecology, nature management and protection using information and communication, including geoinformation technologies.</p>	<p><b>GPC-5.1</b> Knows how to choose and apply algorithm for solving environmental problems and implements algorithms using software</p>
	<p><b>GPC-5.2</b> Has the skills to use information technology tools for searching, storing, processing, analyzing and presenting information</p>
	<p><b>GPC-5.3</b> Able to process earth remote sensing data and use cartographic materials, owns modern GIS technologies</p>

<b>GPC-6.</b> Able to design, represent, protect and disseminate the results of their professional activities, including research.	<b>GPC-6.1</b> 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
	<b>GPC-6.2</b> Possesses the skills of oral report and presentation with regards to the project and scientific activities results
	<b>GPC-6.3</b> Knows methodological foundations of scientific research, copyright and scientific ethics requirements
<b>PC-2</b> Able to develop and economically justify plans for the introduction of new equipment and technologies to ensure minimal waste impact on the environment	<b>PC-2.1</b> Has the skills to select and implement the best available technologies (BAT) for the processing and recycling of production and consumption waste
	<b>PC-2.2</b> Can economically justify plans for the introduction of new equipment and technologies for waste management, using them as a secondary resource
	<b>PC-2.3</b> Capable of minimizing the waste impact on the environment
<b>PC-3</b> Able to develop measures for the economic regulation of the organization's environmental activities	<b>PC-3.1</b> Able to predict socio-economic development based on environmental forecasts
	<b>PC-3.2</b> Knows how to determine the economic effect of the measures application aimed at ensuring the enterprise environmental safety
<b>PC-5</b> Able to analyze the causes and minimize the consequences of the production negative impact on the environment	<b>PC-5.1</b> Able to identify the causes and sources of harmful substances entering the environment and the causes and sources of solid waste generation
	<b>PC-5.2</b> Has the skills to prepare proposals to eliminate the causes and eliminate the negative consequences of the impact
	<b>PC-5.3</b> 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*
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<b>GC-1</b>	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
<b>GC-2</b>	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
<b>GC-3</b>	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
<b>GC-4</b>	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
<b>GC-6</b>	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
<b>SPC-1</b>	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
<b>SPC-2</b>	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	
<b>SPC-3</b>	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
<b>SPC-4</b>	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
<b>SPC-5</b>	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
<b>SPC-6</b>	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

<b>PC-2</b>	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
<b>PC-3</b>	possession of the basics of design, expert-analytical 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
<b>PC-5</b>	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*

<b>Modules</b>	<b>Contents (topics, types of practical activities)</b>	<b>Workload, academic hours</b>
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

<b>Modules</b>	<b>Contents (topics, types of practical activities)</b>	<b>Workload, academic hours</b>
	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, resource-saving 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
	<b>TOTAL:</b>	<b>540</b>

## **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
- Ecoservice LLP, Nur-Sultan
- ECO-OKO LLP, Nur-Sultan
- Pavlodar petrochemical plant, Pavlodar

## **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. EDUCATIONAL-METHODOLOGICAL AND INFORMATION SUPPORT OF PRACTICE**

### *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 Engineering2011. 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](http://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/](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:**

Senior Lecturer of the ES&PQM  
Department



**Popkova A.V.**

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Position, BUP

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Signature

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Name, Surname

### **HEAD OF EDUCATIONAL DEPARTMENT:**

Director of ES&PQM Department



**Savenkova E.V.**

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Position

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Signature

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Name, Surname

### **HEAD OF HIGHER EDUCATION PROGRAMME:**

Senior Lecturer of the ES&PQM  
Department



**Popkova A.V.**

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Position

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Signature

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Name, Surname