Federal State Autonomous Educational Institution for Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA NAMED AFTER PATRICE LUMUMBA
(RUDN University)

Higher School of Industrial Policy and Entrepreneurship
(faculty/institute/academy - the higher education program developer)

COURSE SYLLABUS

Industrial Ecology
(name of the discipline/module)

Recommended by the Didactic Council for the Education Field of:

38.04.02 Management
(field of studies / speciality code and title)

The study of the discipline is conducted as part of the professional program of higher education.

Engineering Management
(name (track/specialization) of professional program of higher education)

2023

1. THE GOAL OF THE DISCIPLINE

The goal of mastering the *Industrial Ecology* discipline is to study the theoretical foundations and practical tools for the optimal organization of quality management at enterprises, and for the subsequent development of a system that meets the recommendations of ISO 9000 International Standards and the requirements of Total Quality Management (TQM).

2. REQUIREMENTS FOR DISCIPLINE OUTCOMES

The mastering of the *Industrial Ecology* discipline envisages building the following competencies (parts of competencies) in students:

Table 2.1. The list of competencies acquired by students in the course of the discipline (outcomes of the discipline)

Competence Code	**Competence Descriptor**	**Competence Formation Indicators** (within this discipline)
GC-1	Ability to perform critical analysis of problematic situations based on the systemic approach and to develop a plan of action	GC-1.1 Analyzes the task and singles out its basic components GC-1.2 Defines and prioritizes the information needed to solve the task GC-1.3 Searches the information to solve the task by various types of queries GC-1.4 Offers solutions to the problem, analyzes the possible consequences of their use GC-1.5 Analyzes the ways of solving problems of worldview, moral and personal nature based on the use of fundamental philosophical ideas and categories in their historical development and socio-cultural context
GC-7	Capability to use digital technologies and methods of searching, processing, analyzing, storing and presenting information (in the professional field) in the context of digital economy and modern corporate information culture.	GC-7.1. Searches the necessary sources of information and data, perceives, analyzes, consolidates and transfers information using digital tools, as well as using algorithms when working with data obtained from various sources in order to use efficiently the information received for problem solving; GC-7.2. Assesses information, its reliability, makes logical thoughts based on incoming information and data;
PC-1	Capability to manage the efficiency of an investment project	PC-1.1 Defines the operations and their sequence to implement the investment project.

3. THE PLACE OF DISCIPLINE IN HIGHER EDUCATION PROGRAM STRUCTURE The *Industrial Ecology* discipline is an elective block formed by students.

Within the higher education program students also take other disciplines and/or internships that contribute to the achievement of the expected learning outcomes as results of mastering the *Industrial Ecology* discipline.

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

Competence Code	Competence Descriptor	Previous Disciplines/Modules, Practices*	Subsequent Disciplines/Modules, Practices*
GC-1	Ability to perform critical analysis of problematic situations based on the systemic approach and to develop a plan of action		Methodology of Management Problems Research Modern Strategic Analysis
GC-3	Ability to organize and manage a team. Developing a team strategy for achieving the set goal.		Strategic Management in Industrial Companies
PC-1	Capability to manage the efficiency of an investment project		Strategic Management in Industrial Companies

4. SCOPE OF DISCIPLINE AND TYPES OF SCHOLASTIC WORK

The total workload of the discipline is 3 credits.

*Table 4.1. Types of educational work according to the periods of mastering the higher education program for **FULL-TIME** students*

Type of Educational Work			Total hours	Semesters			
				1/1	1/2		
1.	**Classroom Classes (total)**		36	36			
	Including:		-	-			
1.1.	Lectures		18	18			
1.2.	Other activities						
	Including:						
1.2.1.	Seminars (C)		18	18			
	Practice Training (PT)						
2.	**Autonomous Work (total)**		63	63			
	Including:						
2.1.	Calculation and graphic works		-				
	Other types of autonomous work						
	Preparation and passing of midterm assessment		9	9			
3.	**Total Workload (academic hours)**		108	108			
	Total Workload (Credits)		3	3			

5. DISCIPLINE CONTENT

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

No	Name of the Discipline Section	Content of the Section (topics)	Type of Educational Work
1	Theoretical Foundations of Environmental Management	Theoretical Foundations of Environmental Management	Lecture, self study
2	The Main Areas of Environmental Policy	The Main Areas of Environmental Policy	Lecture, self study

3	International Environmental Management Standards	International Environmental Management Standards	Lecture, self study
4	Environmental Certification	Environmental Certification	Lecture, self study
5	Environmental Product Labelling	Environmental Product Labelling	Lecture, self study
6	Environmental Food Safety Management	Environmental Food Safety Management	Lecture, self study
7	Environmental Management System Development	Environmental Management System Development	Lecture, self study
8	Environmental Information Systems of the Enterprise	Environmental Information Systems of the Enterprise	Lecture, self study
9	Fundamentals of Environmental Regulation	Fundamentals of Environmental Regulation	Lecture, self study

6. EQUIPMENT AND TECHNOLOGICAL SUPPORT OF THE DISCIPLINE

Table 6.1. Equipment and technological support of the discipline

Classroom Type	**Equipment of the Classroom**	**Specialized Educational/Laboratory Equipment, Software and Materials for the Discipline** (if necessary)
Lecture Hall	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical means of multimedia presentations.	21 workplaces: system unit P4 C2D/3160 MHz MB/ 320 GB/DVD±RW/ LCD monitor 19"+ 1 projector
Colloquium	A classroom for conducting colloquium-type classes, group and individual consultations, ongoing monitoring and midterm assessment, equipped with a set of specialized furniture and multimedia presentation equipment.	21 workplace: Celeron system unit/2600 MHz/1280 MB/ 40 GB/DVD ROM/ LCD monitor 17"+ 1 projector + WiFi access point
Computer Class	A computer classroom for conducting classes, group and individual consultations, continuous control and midterm assessment, equipped with personal computers (___ pcs.), a blackboard (screen) and multimedia presentation technical means.	21 workplace: Celeron system unit/2600 MHz/1280 MB/ 40 GB/DVD ROM/ LCD monitor 17"+ 1 projector + WiFi access point
Autonomous Work of Students	A classroom for autonomous work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to EIEE.	21 workplaces: system unit P4 C2D/3160 MHz MB/ 320 GB/DVD±RW/ LCD monitor 19"+ 1 projector

7. INFRASTRUCTURE AND INFORMATIONAL SUPPORT NECESSARY FOR THE DISCIPLINE

a) Main Readings:

1. Anisimov A.V. Ekologichesky menegement [Environmental management]. Phoenix, 2019 – 348c.
2. Maslennikova, I. S. Ekologichesky menedgement i audit [Environmental management and audit]: textbook and workshop for universities / I. S. Maslennikova, L. M. Kuznetsov. —

2nd ed. — Moscow : Yurayt Publishing House, 2023. — 311 p. — (Higher education). — ISBN 978-5-534-14568-7. — Text : electronic // Educational platform Yurayt [website]. — URL: https://urait.ru/bcode/511443

b) Additional Readings:_

3. Belov, P. G. Tehnogennye sistemy i ekologicheskii risk [Technogenic systems and environmental risk]: textbook and workshop for universities / P. G. Belov, K. V. Chernov ; edited by P. G. Belov. — Moscow : Yurayt Publishing House, 2023. - 366 p. — (Higher education). — ISBN 978-5-534-00605-6. — Text : electronic // Yurayt Educational Platform [website]. — URL: https://urait.ru/bcode/511835

4. Ekonomika prirodopolzovaniya i ecologicheski menedgement [Economics of nature management and environmental management]: textbook for universities / N. V. Pakhomova, K. K. Richter, G. B. Malyshkov, A.V. Khoroshavin. — Moscow : Yurayt Publishing House, 2023. — 417 p. — (Higher education). — ISBN 978-5-534-13446-9. — Text : electronic // Yurayt Educational Platform [website]. — URL: https://urait.ru/bcode/511338

Resources of the Internet information and telecommunication network:

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

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 following training toolkit for the student's autonomous work is envisaged as part of mastering the discipline/module*:

1. A course of lectures on the *Industrial Ecology* discipline.
2. Laboratory workshop on the *Industrial Ecology* discipline (if laboratory work is available).
3. Methodological guidelines for drafting and formatting the course paper/project on the *Industrial Ecology* discipline (if there are ones).

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM FOR COMPETENCES LEVEL EVALUATION

The assessment materials and the grading system* to evaluate the graduate's level of competences (part of competences) formation as the results of the *Industrial Ecology* discipline are specified in the Appendix to course syllabus.

DEVELOPERS:

Associate Professor of the Applied Economics Department		V.A. Ermakov
Position, educational department	Signature	Name, surname

HEAD OF EDUCATIONAL DEPARTMENT:

Deputy Head of the Applied Economics Department  A.A. Chursin

Name of the educational department	Signature	Name, surname

Program Manager
PhD of Economics, Associate Professor

Of the Applied Economics Department  A.A. Ostrovskaya
position, name of the department signature Name, surname

Annex

Methodological guidelines for students on mastering the discipline (module)

The implementation of the course provides interactive lectures, practical classes (colloquiums) using multimedia equipment, preparation of autonomous creative projects and their subsequent presentations, testing, group discussions on the subject of the course, modern knowledge control technologies.

While studying the discipline, the student must attend a course of lectures, participate in the number of colloquiums provided by the course syllabus, study autonomously some topics of the course and confirm their knowledge during control activities.

The student's work in lectures consists in clarifying the basics of the discipline, briefly taking notes of the material, and clarifying issues that cause difficulties. The lecture notes are the basic educational material along with the textbooks recommended in the main list of readings.

The teaching of the main part of the lecture material involves usage of multimedia tools that facilitate the comprehension and consolidation of the material. Presentations are available for download from the RUDN website and can be freely used by students for educational purposes.

The student must master all the topics provided for by the educational and thematic plan of the discipline. Individual topics and training issues must be mastered autonomously. The student studies the recommended literature, briefly outlines the material, and clarifies the most difficult questions that require clarification during consultations. The same should be done with sections of the course that were skipped due to various circumstances.

For an in-depth study of the issue, the student should study the literature from the additional readings list and specialized websites. It is also recommended that students communicate in professional community forums.

Students study educational, scientific literature and periodicals on an autonomous basis. They have the opportunity to discuss what they have read with the teachers of the discipline during scheduled consultations, with other students at colloquiums, as well as at lectures, asking the professor questions.

The control of autonomous work is carried out by the professor in charge. Depending on the teaching methodology, the following forms of continuous assessment can be used: a short oral or written survey before the start of classes, tests, control papers, written homework, essays, etc.

The assessment toolkit for the midterm assessment of students in the discipline (module) *(developed and issued in accordance with the requirements of the " Regulations for the Formation of Assessment Toolkit (FOS"), approved by the Rector's order No. 420 dated 05.05.2016).*

The code of the controlled competence or its part	Controlled Discipline Section	Controlled Discipline Topic	Assessment Toolkit (forms of control of mastering the professional program)											Scores Topics	Section Scores
			Classroom Work					Autonomous Work					Exam/Test		
			Survey	Test	Colloquium	Control Paper	Discussion	Essay	Homework	Report	Creative Project	Course Paper / project			
GC-1, GC-7, PC-1	Section 1.	Theoretical Foundations of Environmental Management					5								20
		The Main Areas of Environmental Policy	2					2							
		International Environmental Management Standards	2						5						
GC-1, GC-7, PC-1	Section 2.	Environmental Certification							5						20
		Environmental Product Labelling					5								
		Environmental Food Safety Management					5								
GC-1, GC-7, PC-1	Section 3. Modern Approaches to Business Process Modeling	Environmental Management System Development							5						20
		Environmental Information Systems of the Enterprise	2												
		Fundamentals of Environmental Regulation									10				
GC-1, GC-7, PC-1		Milestone Certification (Control Paper)				10								10	10
		Test		10										10	10

GC-1, GC-7, PC-1		Credit											20	20	20
		TOTAL													100

Applied Economics Department

Examination Cards

Industrial Ecology Discipline

EXAMINATION CARD No. 1

1. The concept of quality, the quality of products, production and company
2. Quality Management Tools. Control sheets.

Compiled by _____Tarmzhanova R.Sh._____
(signature)
Head of the department _____Chursin A.A. _____
(signature)

EXAMINATION CARD No. 2

1. Quality Systems Certification: tasks, principles, procedure.
2. Purpose and use of arrow charts

Compiled by _____Tarmzhanova R.Sh._____
(signature)
Head of the department _____Chursin A.A. _____
(signature)

As part of the exam, the level of mastering all the competencies of the discipline can be controlled (depending on the question).

The set of examination cards includes assessment criteria for the discipline developed by the teacher and approved at the meeting of the department.

Criteria for assessing of answers to exam questions:

The answer to each exam is valued from 0 to 10 points:

Answer Assessment Criteria:	**Scores**		
	The answer does not meet the criteria	**The answer partially meets the criteria**	**The answer fully meets the criteria**
The answer is correct	0	1	2
The student answers without suggestive questions from the examiner	0	0.5	1
The student practically does not use the prepared draft	0	0.5	1

The answer demonstrates the student's confident command of the terminological and methodological apparatus of the discipline	0	1	2
The answer has a clear logical structure	0	1	2
The answer demonstrates the student's understanding of the connections between the subject of the question and other sections of the discipline and/or other disciplines	0	1	2

This Program has been developed in line with the requirements of the RUDN University Educational Standards.

Developers:

Senior Lecturer of the Applied Economics Department _____ Tarmzhanova R.Sh._
position, name of the department signature Name, surname

HEAD OF EDUCATIONAL DEPARTMENT:

Deputy Head of the Applied Economics Department  A.A. Chursin

_____ _____ _____
Name of the educational department Signature Name, surname

Program Manager
PhD of Economics, Associate Professor

Of the Applied Economics Department_____  _____ A.A. Ostrovskaya
position, name of the department signature Name, surname