

MINISTRY OF EDUCATION AND RESEARCH OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
M.V. Lomonosov Northern (Arctic) Federal University

APPROVED by
Vice-Rector for Education



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Date 26.04.2016

PROGRAMME HANDBOOK

05.04.06 Ecology and Environmental Management

Master's Degree Programme

Environmental Risk Management in the Arctic (ERMA)

Arkhangelsk, 2016

1. Rationale for the Programme

1.1 Brief description of the institutional context

Master's degree programme 05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA) is offered by the Institute of Natural Sciences and Technologies of the Northern (Arctic) Federal University named after M.V. Lomonosov (hereinafter, the 'University' and NArFU).

Northern (Arctic) Federal University, located in Arkhangelsk, is one of Russia's 10 federal universities and one of the largest universities of North-West Russia. It is a member of the Magna Charta Universitatum, of the Association of Leading Russian Universities and the Eurasian University Association.

The University mission consists in creating innovative scientific and human resources for the purposes of intellectual exploration of the Russian North and Arctic. NArFU's strategic tasks are closely linked with implementation of the national geopolitical interests in the Arctic. Russia lacks experts and technologies for the development of its Arctic area, its continental shelf and infrastructure. The University creates conditions necessary to support the industrial projects in the polar region with personnel and technologies. Apart from training specialists in engineering and technology, the University offers education in life sciences, social and humanitarian fields. The University has long-standing academic traditions in training specialists in linguistics, intercultural communication, journalism, law, international relations, psychology and education.

Offering 356 degree programmes of higher education, NArFU incorporates 16 institutes, each specializing in several research areas including interdisciplinary ones:

- Institute of Civil Engineering and Architecture;
- Forestry Engineering Institute;
- Integrated Safety Institute;
- Institute of Oil and Gas;
- Higher School of Economics and Management;
- Institute of Energy and Transport;
- Institute of Physical Education, Sport and Health;
- Biomedical Research Institute;
- Institute of Philology and Cross-Cultural Communication;
- Institute of Pedagogics and Psychology;
- Institute of Mathematics, Information and Space Technologies;
- Institute of Natural Sciences and Technologies;
- Institute of Humanities (branch in Severodvinsk);
- Institute of Humanities, Social and Political Sciences;
- Law Institute;
- Institute of Shipbuilding and Arctic Marine Engineering (branch in Severodvinsk).

The Institute of Natural Sciences and Technologies in keeping with the university mission has two key areas of activity. The first focus is teaching of the natural Sciences for students in engineering majors. The modern engineer cannot be successful in the profession, if he does not know the basics of physics, chemistry, ecology and lean manufacturing. Many of NArFU goals – one of which is training qualified staff for the Arctic region – cannot be accomplished unless this major issue is addressed.

The second focus is on delivering of science education at the bachelor, master and PhD levels. The significance of this direction in the context of the objectives of the University is based on the assumption that fundamental and applied scientific training provides the region's researchers, capable of a high scientific level to solve the problems of the conservation of the biodiversity and ecology of the Arctic, develop new methods and ways of protection of the environment and of environmental risk management.

The Institute fosters innovation in both education and research in the fields of natural sciences and technology and in the training of teachers for natural sciences.

1.2 Brief description of the professional field

Master's degree programme 05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic aims to set new approach in the field of Environmental Risk Management applied to the Arctic region. The programme aims at educating specialists in environmental management for the Arctic region capable of evaluating and preventing ecological risks caused by human activities.

The programme focuses on a deep understanding of the principal tools, techniques and management concepts to respond to environmental risks and make decisions on a local and national level. The main emphasis is made on the theory and practice of assessment of natural resources utilization and conducting environmental research. Students also have access to courses that enhance their English proficiency in professional field.

The programme is designed to serve different types of students. For graduates in Ecology and Environmental Management, Biology or other related fields the programme is an ideal opportunity to continue and deepen their studies, and also the basis for acceptance to a doctoral degree programme in Ecology and Environmental Management.

The programme has been designed through a process of collaborative work of experts including consultations, reading, benchmarking and reflection. It is in keeping with the Law of the Russian Federation on Education and a set of educational and professional standards, regulations and other approved documents of the federal or institutional levels. It is also aligned to international standards and requirements including the European Qualifications Framework (EQF).

1.3 Brief description of the career prospects

Master's degree programme 05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic leads to a variety of career destinations in ecology and environmental management. Graduates of the programme can choose professional tracks including a career in the business sector or with a governmental or a non-governmental body or academic research. They can continue education in a PhD programme in the fields of applied ecology or environmental management.

2. Programme Details

2.1	Awarding Institution	Northern (Arctic) Federal University
2.2	Teaching Institution and location of delivery	Northern (Arctic) Federal University, Institute of Natural Sciences and Technologies
2.3	Final Award	Masters' degree in Ecology and Environmental Management
2.4	Programme Title	Environmental Risk Management in the Arctic (ERMA)
2.5	Programme Code	05.04.06
2.6	Programme Accreditation	Accredited in May 2014 till May 2020 (Accreditation Certificate № 0988)
2.7	Relevant Subject Benchmarking	Ecology and related studies Environmental protection
2.8	NFQ Level	7
2.9	Credits (ECTS)	120
2.10	Programme Duration	2 years
2.11	Modes of attendance offered (full-time, part-time, e-learning /distance)	Full-time
2.12	Language of instruction	English

2.13	Programme Coordinator	Dr. Boris Philippov
2.14	Last updated	April 2016 Institute's Education Board, minutes no. 9 dd. 26.04.2016.
2.15	Programme aim/mission	
Training specialists in environmental management for the Arctic region capable of evaluating and preventing ecological risks caused by human activities		
2.16	Programme objectives	
<ul style="list-style-type: none"> – To develop students' knowledge and understanding of fundamental theories, concepts and principles in environmental risk management; – To create learning environments for the development of students' skills in of evaluating and preventing ecological risks caused by human activities; – To enable students to undertake empirical research in relevant areas of environmental risk management; – To foster students' independent learning and transferable skills required for continuing professional development; – To increase students' English language proficiency in professional field 		
2.17	Programme distinctions	
<ul style="list-style-type: none"> – Content of the programme is very integrated. It is combined knowledge and skills of law, ecological analyses, environment management, risk management and Clean production technologies; – International partner in programme (UiT) – Module structure of the programme allows students to participate in academic mobility programmes; – Mode of teaching allows students to combine professional employment and studies; – Language of instruction is English 		
2.18	Alignment to national educational and occupational standards and other regulatory documents	
<ul style="list-style-type: none"> – The Law of the Russian Federation on Education (№ 273-FL, dd. 29.12.2012); – Federal State Educational Standard for Higher Education (hereinafter, FSES-HE) 05.04.06 Master's Level, Ecology and Environmental Management, approved by RF Ministry of Education and Research (Order № 1041 dd.23.09.2015); – Procedures for Managing Higher Education Degree Programmes (bachelor's, master's and specialist's degrees), approved by RF Ministry of Education and Research (Order №1367, dd. 19.12.2013); – Guidelines for Institutions of Higher Education in Providing Conditions for Teaching and Learning of Physically Challenged Students and Students with Special Needs, approved by RF Ministry of Education and Research (Order № AK-44/05 dd. 08.04.2014); – Guidelines in Developing Higher Education Degree Programmes and Programmes of Continuing Education with Consideration of Corresponding Occupational Standards, approved by RF Ministry of Education and Research (Order № ДЛ-01/05, dd. 22.01.2015); – University Charter 		
2.19	Alignment to international standards and requirements	
<ul style="list-style-type: none"> – The European Qualifications Framework (EQF); – Cambridge English Teaching Framework (UCLES, 2014); – Reference Points for the Design and Delivery of Degree Programmes in Ecology (Tuning Project) 		
2.20	Graduate competency	
<ul style="list-style-type: none"> – Core: Research in applied ecology and environment management; 		

– Non-core (complementary): design and production activities in ecology, managerial activity

3. Intended Programme Learning Outcomes

Learning Outcome code	Intended learning outcomes
LO1	Demonstrate in-depth knowledge and critical understanding of theories, principles, concepts and methodologies in domain of the environmental risks management
LO2	Being able to deal with complex problems in the environmental risk management
LO3	Being able to comprehend and interpret the theoretical development
LO4	Being able to reflect on the own way of thinking and working and being able to translate that reflection to the development of more adequate solutions
LO5	Being able to seek solutions meaning analysing and defining complex problems related to the professional practice and being able to develop and apply meaningful strategies to come to a solution of risk management problems
LO6	Being able to apply various methods to assess environment risks
LO7	Plan and implement an independent research project in the system of the environmental risks management in the Arctic
LO8	Being able to communicate the own experiment and solutions to colleagues and laymen
LO9	Being able to cooperate in a multidisciplinary environment
LO10	Having a proper understanding of social responsibilities related to the professional practice

Intended learning outcomes for the programme conform to those defined by:

1) The European and Russian Federation Qualification Frameworks for Masters Level (Level 7).

See Attachment A: the Matrix of the intended programme learning outcomes aligned to the EQF and NQF.

2) Federal State Educational Standard for Higher Education (05.04.06 Master's level, Ecology and Environmental Management).

See Attachment B: Graduate competency as prescribed by Federal State Educational Standard for Higher Education (05.04.06 Master's level, Ecology and Environmental Management).

See Attachment C: Matrix of the intended programme learning outcomes aligned to the FSES-HE (05.04.06 Master's level, Ecology and Environmental Management) requirements to graduates competency.

4. Proposed Programme Structure

4.1 Programme Content

The study period for the programme is two years (24 months) full-time. It consists of taught modules and a dissertation with a total of 120 credits. The taught part of the programme consists of seven modules in Environmental Risk Management with the value from 5 to 15 credits. 24 credits are allocated to research and practice module; and 6 credits – to state final certification which includes a dissertation.

Each module contains a number of compulsory and optional units which are taught in sequence.

The 120 credits of the programme are distributed as follows:

Module code	Module Title	ECTS	Status (M/O/E) (M- mandatory; O-optional; E-elective)
Б1.Б.1	Module A: Basic Module	5	
Б1.Б.1.1	Philosophical Issues in Natural Science	2	M
Б1.Б.1.2	Foreign Language	3	M
Б1.Б.2	Module B: Mathematical and Instrumental Methods in Ecology and Environmental Management	15	
Б1.Б.2.1	Computer Technologies and Statistical Methods in Ecology and Environmental Management	3	M
Б1.Б.2.2	Spatial Analysis	3	O
Б1.Б.2.3	Mathematical Modeling of Ecosystems	3	O
Б2.П.1	Module Scientific Research Practice	6	O
Б1.В.ОД.1	Module C: Environmental Law	10	
Б1.В.ОД.1.1	Environmental Law System	4	O
Б1.В.ОД.1.2	Environmental Law of the Russian Federation	2	O
Б1.В.ОД.1.3	International Environmental Law	2	O
Б1.В.ОД.1.4	Environmental Law and Indigenous Peoples Rights	2	O
Б1.В.ОД.2	Module D: Environmental Monitoring	15	
Б1.В.ОД.2.1	Priority Pollutants of the Arctic Territories	3	O
Б1.В.ОД.2.2	Environmental Pollution Assessment	3	O
Б1.В.ДВ.1.1	Environmental Risks in the Arctic Region	3	E
Б1.В.ДВ.1.2	Contemporary Phisico-chemical Methods of Environmental Risk Reduction		E
Б2.П.2	Module Scientific Research Practice	6	O
Б1.В.ОД.3	Module E: Environmental Management and Nature Protection	15	
Б1.В.ОД.3.1	Environmental Management System	3	O
Б1.В.ОД.3.2	Corporate Environmental Management System	3	O
Б1.В.ДВ.2.1	Management Decisions in the Field of Environmental Safety	3	E
Б1.В.ДВ.2.2	Sustainable Development of Russian Industry		E
Б2.П.3	Module Scientific Research Practice	6	O
Б1.В.ДВ.3	Module F: Risk Management	15	
Б1.В.ДВ.3.1	Risk Management	9	O
Б2.П.4	Module Scientific Research Practice	6	O
Б1.В.ДВ.4	Module G: Clean Production Technologies	15	
Б1.В.ДВ.4.1	Clean Production Technologies	9	O
Б2.П.5	Module Scientific Research Practice	6	O
Б2	Research Module	24	
Б2.Н1	Independent research work on Master's thesis.	18	O
Б2.П.6	Research Practice Period	6	O
Б.3	State Final Assessment	6	M

4.2 Proposed Programme Structure Diagram

Curriculum 05.04.06 Ecology and Environmental Management
Master's programme "Environmental Risk Management in the Arctic" (120 ECTS)

	Module A: Basic Module (5 ECTS)	Module B: Mathematical and Instrumental Methods in Ecology and Environmental Mnagement (15 ECTS)	Module C: Environmental Law (10 ECTS)
1 semester	<ul style="list-style-type: none"> Philosophical Issues in Natural Science – 2 ECTS; Foreign language – 3 ECTS 	<ul style="list-style-type: none"> Computer Technologies and Statistical Methods in Ecology and Environmental Management – 3 ECTS; Spatial Analysis – 3 ECTS; Mathematical Modeling of Ecosystems – 3 ECTS; Scientific research practice – 6 ECTS 	<ul style="list-style-type: none"> Environmental Law System - 4 ECTS; Environmental Law of the Russian Federation – 2 ECTS; International environmental law – 2 ECTS; Environmental law and Indigenous Peoples law – 2 ECTS

2 semester	Module D: Environmental Monitoring (15 ECTS) <ul style="list-style-type: none"> • Priority Pollutants of the Arctic Territories – 3 ECTS; • Environmental Pollution Assessment – 3 ECTS; • Elective courses: Environmental Risks in the Arctic Region – 3 ECTS or Contemporary Phisico-chemical Methods of Environmental Risk Reduction – 3 ECTS; • Scientific Research Practice – 6 ECTS 		Module E: Environmental Management and Nature Protection (15 ECTS) <ul style="list-style-type: none"> • Environmental management system – 3 ECTS; • Enterprise environmental management system – 3 ECTS; • Managerial decisions in the sphere of environmental security – 3 ECTS or Sustainable development of the Russian industry – 3 ECTS; • Scientific Research Practice – 6 ECTS 	
3 semester	Module F: Risk Management (15 ECTS) <ul style="list-style-type: none"> • Risk Management – 9 ECTS; • Scientific Research Practice – 6 ECTS 		Module G: Clean Production Technologies (15 ECTS) <ul style="list-style-type: none"> • Clean Production Technologies – 9 ECTS; • Scientific Research Practice – 6 ECTS 	
	Module F2: International emergency preparedness and environmental protection in the High North (10 ECTS) – UiT	Module G2: Safety and risk analysis (10 ECTS) – UiT	Module H: Academic writing (10 ECTS) – UiT	
4 semester	Research Module (30 ECTS) <ul style="list-style-type: none"> • Independent research work on Master’s thesis – 18 ECTS; • Research Practice Period – 6 ECTS 			Final State Certification – 6 ECTS

The programme provides an opportunity for exchange studies at UiT — the Arctic University of Norway in the 3rd semester with pre-approved courses:

Module F2: International emergency preparedness and environmental protection in the High North (10 ECTS)

Module G2: Safety and risk analysis (10 ECTS)

Module H: Academic writing (10 ECTS)

5. Criteria for Admission

Applicants are normally required to hold a Bachelor's degree (or specialist) in Linguistics or Language Pedagogy or in other fields of Humanities or Pedagogy from this or another approved University.

Applicants with degrees other than the above mentioned can also apply.

All applicants need to have English level proficiency equivalent to B2 or above.

No knowledge of Russian is required.

Details of the university admission policy can be found at:

http://narfu.ru/upload/iblock/eeb/pravila_priema_2016_10_02_2016_1.pdf

Information for international students can be found at:

http://www.narfu.ru/en/studies/non_degree/studyinrussia/index.php?clear_cache=Y);

6. Teaching and Learning

The programme is designed in a modular format providing clear and well-balanced structure for students to acquire the intended learning outcomes. All modules are taught face-to-face. Some units of the programme modules can be taught via the web as well as face-to-face.

6.1 Teaching and Learning Methods

Teaching and learning on the programme combines a sophisticated set of approaches and methods appropriate to the intended programme and module learning outcomes.

Major approaches which lay the ground for the teaching and learning process are the following:

– *Learner-centered approach* which emphasizes the learner's critical role in constructing meaning from new information and prior experience and focuses on skills and practices that enable lifelong learning and independent problem-solving.

– *Active Learning* which encourages to engage students in two aspects – doing things and thinking about the things they are doing. Active learning requires appropriate learning environment

which promotes research based and interdisciplinary learning; encourages leadership skills of the students through self-development activities; stimulates collaborative learning for building knowledgeable learning communities; cultivates task based performance by giving student's a realistic practical sense of the subject matter learnt in the classroom.

A variety of **teaching and learning tools** are employed throughout the programme to support learners including lectures, seminars, tutorials, workshops/laboratory works, research and practical projects, practical courses, field trips and field works.

Lectures are the primary means for sharing knowledge and understanding with the students, while seminars and workshops/laboratory works allow students to make connections between theory and practice, to apply theoretical knowledge in simulated practical situations. Tutorials are a means of learner-centered approach to teaching, they are arranged to meet individual learner needs.

Research and practical projects, practical courses, field trips and field works enhance students' knowledge and understanding in the fields of study as well as develop professional and transferable skills/generic competences (independent and critical thinking, self-management; collaborative and communication skills, etc.).

Professional and transferable skills are also developed through a variety of interactive activities including analysis of case studies, problem-based tasks, discussion forums, pair and group work, simulations, presentations where students are supposed to analyse environmental problems, to design and interpret ecological database. Whenever possible students are encouraged to work in groups through small-group activities, problem-based tasks and project work.

6.2 E-learning and virtual learning environment

The delivery of all modules is supported by the University e-learning environment. It is used to provide access to resources, both print and online, to submit assignments and provide electronic feedback, to develop discussion and debate through discussion posts, to engage in online assessment and practice. This supports directed study at module level and provides access to a wide range of tools for self-directed study.

The University's digital teaching and learning setting is comprised by:

- Teaching and Learning Management System “Tandem. University”;
- SAKAI platform (<https://sakai.pomorsu.ru/portal>);
- eLibrary (<http://library.narfu.ru/rus/EResources/Pages/default.aspx>);
- eTimetable (<http://ruz.narfu.ru/?inst=1>).

“**Tandem. University**” is an integrated IT system embedded in the University's infomedia via an enterprise service bus; ensures automation of the University's entire range of education activities. Capable of sharing its details of the student body with other IT systems, it receives the information on the faculty staff and is compatible with the University-operated network services, enabling users to use a single user account.

SAKAI platform serves to create virtual learning environment for distance learning, for students' collaborative practice and tutorials. SAKAI incorporates a set of software tools to serve the purposes of distance and e-learning. It offers all the learners and the faculty staff access to the degree programme packages. Students may use the user profile service to receive updates or register for an optional course.

eLibrary is the University's educational resource designed for storing and distributing the digitalized publications pertaining to the areas of scholarly endeavor and education activities. The eLibrary forms part of the University's library stocks and consists of:

- e-catalogue;
- e-collection (University-produced electronic publications);
- digital copies of the printed publications received from authors/copyright holders/other legitimate sources; digital resources which are disseminated via licenses (i.e., contractual, legal agreements).

eTimetable is a service for posting the schedule of classes online. It offers learners access to the schedule of classes and class time updates from any place via any Internet-connected device.

6.3 Support for student learning

Induction for international students

During the first week of September international students can attend the Induction Week where they are given a general introduction to the University campus, student life and support services.

Academic support

Student academic guidance is provided by Degree Programme coordinator, module leaders, Director and Deputy Director of the Institute. The module leader/lecturer/instructor acts as the first person to contact for subject-specific academic support and advice. Thereafter the Degree Programme coordinator or Director and Deputy Director of the Institute may be consulted.

Issues relating to the dissertation / individual research projects are coordinated by the appointed personal research supervisor. Minor academic advice can be provided by the administrative support staff of the Institute.

Issues relating to the opportunities for study abroad and participation in international projects are coordinated by the International Cooperation Department where students can University get all the necessary information and guidance.

Support for students with disabilities

The University Resource Center for Inclusive Education provides help and advice for disabled students at the University. It provides the individuals with advice about the University's facilities, services and the accessibility of campuses; details about the technical support available; guidance in study skills, a resources room with equipment and software to assist students in their studies (<http://narfu.ru/inclusive-education/>).

Welfare and psychological support is provided by the University Center of Volunteering and Social Work. Students with disabilities and special educational needs can get there detailed information about social support programmes and activities of the national, regional and institutional levels, apply for individual psychological help.

Academic support is provided by the Programme coordinator and programme managerial staff, as well as by the personal research supervisor. According to the University regulations, students with disabilities and special educational needs can pursue an individual study track.

6.4 Learning resources and facilities

The University's main learning resources are provided by the University Library (Research Library – Intellectual Center named after E.Ovsyankin) and IT Services Department.

The University Library resources provide sufficient coverage to fields of ecology and environmental management. The University Library has a range of electronic sources of information (see above).

The University IT Services Department supports campus-wide computing facilities which comprise several hundred computers 243 in the Institute of Natural Sciences and Technologies, and provides ICT services.

The teaching spaces in the Institute of Natural Sciences and Technologies located at Severodvinskaya 13a, Lomonosova 4, nab. Northern Dvina 22, include a large lecture theatre (200 seaters); several smaller lecture theatres (50-80 seaters) and a sufficient number of auditoriums.

There are also laboratory facilities for those students studying on an ecological degree and for those taking Institution-wide ecological modules. Such facilities include rooms providing conditions for practical classes in ecology and risk management; classes with multimedia equipment, laboratories with special facilities like Lab of Media Recourses and Technologies, Laboratory of geochemical studies, Chemical research laboratory.

7. Assessment regulations

7.1 Assessment methods

Assessment allows students to understand their progression through the programme in terms of the extent to which they have met the associated learning outcomes. The Programme team is

committed to providing assessment that is timely, fair and corresponds to the learning outcomes attached to the module/unit.

Students' progression is subject to the University Regulations of Students Assessment and Progression Control for Higher Education Degree Programmes (Rector's order № 462, dd. 27.05.2015) which define the procedures of formative and summative assessment as well as reassessment opportunities with certain restrictions.

Assessment tasks are developed by the Programme team through constructive alignment of learning outcomes, learning and teaching strategies with assessment methodology.

Assessment tasks are developed for each module/unit of the programme and accompanied by grading schemes and communicated to students appropriately. Formative assessment is built into the learning and teaching strategy through feedback on completion of individual and group assessment tasks. Summative assessment (examinations, master thesis) usually takes place on completing the study of the module/unit. Integrated assignments that enable assessment across a number of modules are used, where feasible. Assessment tasks are reviewed and developed annually to reflect changes and development of the Programme.

The majority of modules are assessed by reflexive essays, individual and group projects and presentations, analysis of case studies, practice report, oral or written exams. Full details are given in the module descriptors.

The following table shows indicative assessment methods for each module of the Programme:

Modules	Essay	Case study analysis	Project	Presentation	Reports	Written exam	Oral exam	Dissertation
Module A: Basic Module	X	X		X	X			
Module B: Mathematical and Instrumental Methods in Ecology and Environmental Management				X	X	X		
Module C: Environmental Law	X			X	X		X	
Module D: Environmental Monitoring	X			X	X			
Module E: Environmental Management and Nature Protection	X		X	X	X			
Module F: Risk Management		X		X	X	X		
Module G: Clean production technologies		X	X			X		
Research module			X	X	X			X
Final State Certification				X				X

7.2 Common marking scheme and assessment criteria

The University employs a common marking scheme and assessment criteria which are specified in the University Regulations of Students Assessment and Progression Control for Higher Education Degree Programmes (point 6.8):

Mark	Percentage band	Mark interpretation	Indicative Quality of Performance
5	90 - 100 %	excellent	Shows extensive and good detailed knowledge of the area; all learning outcomes are achieved and ensure creative approach to major tasks performance.
4	70 – 89 %	good	Shows detailed knowledge but also contains omissions. Learning outcomes are achieved on the whole and ensure adequate performance of major tasks.
3	50 – 69%	satisfactory	Shows minimally acceptable knowledge of the area with a number of misconceptions and errors. Learning outcomes are achieved at the minimal level which can ensure the performance of tasks.
2	0 – 49%	unsatisfactory	Inadequate knowledge. Requires additional training. Learning outcomes are below the minimally acceptable standard and don't ensure performance of major tasks.

8. Programme Learning Outcome Alignment

European Qualifications Framework (EQF), Level 7, Master	National Qualification framework of RF (NQF), Level 7, Master	Programme Learning Outcomes	Suggested Teaching Strategies	Suggested Assessment methods	Module
Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research	Capable of selecting sources and searching for information necessary for further development of professional activities and/or company	LO1: Demonstrate in-depth knowledge and critical understanding of theories, principles, concepts and methodologies in domain of the environmental risks management	Interactive lectures; Practicals; Discussions; Problem solving; Project work; Presentations on the course topics; Reading selected course literature	A reflexive essay; an oral exam; a presentation.	Basic Module, Environmental Law, Environmental Monitoring, Environmental Management and Nature Protection, Research Module
Critical awareness of knowledge issues in a field and at the interface between different fields	Capable of creating new applied knowledge in a certain field or at the interfaces of different fields	LO2: Being able to deal with complex problems in the environmental risk management. LO3: Being able to comprehend and interpret the theoretical development	Interactive lectures; Practicals/labs; Tutorials; Independent research work conducted under the guidance of individual dissertation supervisors	Written and oral assignments related to learner's research: a list of proposed bibliography; a research proposal / pre-prospectus; a literature review; a description of proposed research methodology; a prospectus (proposed summary of the dissertation); a research article; participation in peer-review of students' research articles; presentation of research findings for the conference of young researchers; dissertation	Research Module, Final State Certification
Specialised problem-	Capable of achieving	LO4: Being able to reflect	Interactive lectures;	a reflexive essay;	Mathematical and

<p>solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields</p>	<p>development goals in the field of professional activity by employing new methods and approaches including innovative ones.</p> <p>Develop new methods, approaches and technologies</p>	<p>on the own way of thinking and working and being able to translate that reflection to the development of more adequate solutions.</p> <p>LO5: Being able to seek solutions meaning analysing and defining complex problems related to the professional practice and being able to develop and apply meaningful strategies to come to a solution of risk management problems.</p> <p>LO6: Being able to apply various methods to assess environment risks</p>	<p>Practicals/labs; Discussions; Problem solving; Project work; Presentations on the course topics; Reading selected course literature; Classroom observations; E-learning</p>	<p>a case study analysis; a project</p> <p>Presentations on the course topics; The written and an oral exams</p>	<p>Instrumental Methods in Ecology and Environmental Management, Environmental Law, Environmental Monitoring, Environmental Management and Nature Protection, Risk Management, Clean Production Technologies, Research Module, Final State Certification</p>
<p>Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches</p>	<p>Define strategy, manage processes and activities (including innovative ones), make decisions at the level of institutional structures and their subdivisions</p>	<p>LO7: Plan and implement an independent research project in the system of the environmental risks management in the Arctic</p>	<p>Interactive lectures; Practicals/labs; Tutorials; Independent research work under the guidance of individual dissertation supervisors</p>	<p>Written and oral assignments related to learner's research: a list of proposed bibliography; a research proposal / pre-prospectus; a literature review; a description of proposed research methodology; a prospectus (proposed summary of the dissertation); a research article; participation in peer-review of students' research articles; presentation of research findings for the conference of young researchers; dissertation</p>	<p>Mathematical and Instrumental Methods in Ecology and Environmental Management, Environmental Monitoring, Environmental Management and Nature Protection, Risk Management, Clean Production Technologies, Research Module, Final State Certification</p>
<p>Take responsibility for</p>	<p>Take responsibility for the</p>	<p>LO8: Being able to</p>	<p>Interactive lectures;</p>	<p>Presentations on the</p>	<p>Basic Module,</p>

<p>contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams</p>	<p>performance results of organizations or subdivisions making constituent parts of large-scale institutional structures</p>	<p>communicate the own experiment and solutions to colleagues and laymen. LO9: Being able to cooperate in a multidisciplinary environment. LO10: Having a proper understanding of social responsibilities related to the professional practice</p>	<p>Practicals/labs; Discussions; Problem solving; Project work; Presentations; E-learning</p>	<p>course topics; reports or review, prospectus, etc.); a research article; a reflexive essay; dissertation</p>	<p>Environmental Law, Environmental Monitoring, Environmental Management and Nature Protection, Risk Management, Clean Production Technologies, Research Module, Final State Certification</p>
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9. Module Learning outcome mapping

	Module	Programme Learning Outcomes									
		LO-1	LO-2	LO-3	LO-4	LO-5	LO-6	LO-7	LO-8	LO-9	LO-10
1	Module A: Basic Module	X							X	X	
2	Module B: Mathematical and Instrumental Methods in Ecology and Environmental Management		X		X	X	X	X			
3	Module C: Environmental Law	X			X	X				X	X
4	Module D: Environmental monitoring	X	X		X		X	X		X	
5	Module E: Environmental management and nature protection	X			X	X	X	X		X	X
6	Module F: Risk Management		X	X		X		X		X	X
7	Module G: Clean production technologies		X	X		X	X	X			X
8	Research Module	X	X			X	X	X	X		X
9	Final State Certification		X		X	X	X	X	X		X

10. Requirements to Master Programme Academic Staff as prescribed by Federal State Educational Standard for Higher Education (05.04.06: Master's level, Ecology and Environmental Management)

Requirements to the university academic staff	
Share of the university's administrative and academic staff with relevant qualifications required for the institutions of higher education in the total number of administrative and academic staff	100%
Share of the university's full-time academic staff in the total number of academic staff	60%
The average annual number of publications in Web of Science or Scopus produced by the university's academic staff throughout the programme life cycle, per 100 academic employees	2
The average annual number of publications in RINZ (the Russian Science Citation Index) produced by the university's academic staff throughout the programme life cycle, per 100 academic employees	20
Requirements to the master programme team	
Share of the academic staff with degrees/qualifications relevant to the taught module/unit, in the total number of programme academic staff	60 %
Share of the academic staff with academic degrees (awarded in the RF or abroad and recognized in the RF) and/or academic titles in the total number of programme academic staff	70 % for academic degree programmes 60 % for applied degree programmes
Share of part-time academic from relevant economy field (with at least 3 years of experience in the subject area), in the total number of programme academic staff	20 % for academic degree programmes 15 % for applied degree programmes
Programme (research) leader with the academic degree and/or academic title (awarded in the RF or abroad and recognized in the RF); with programme-level publications in leading native or foreign journals; engaged in research projects; with regular conference participation.	100 %

11. Methods for evaluating and improving the quality of teaching and learning

At the university level the quality of teaching and learning is assured and monitored through a number of measures. Before the new or reviewed programme is launched, a process of degree programme approval takes place which includes consultation with academic and industry subject experts and subsequent programme approval by the University Education Council. The following components and conditions of programme implementation are checked:

- meeting the federal requirements to the programme academic staff;
- adequate resources in place;
- programme aims and objectives are appropriate;
- programme learning outcomes meet the national standards (FSES; NQF; professional/occupational standards);
- meeting internal quality criteria (admissions policy, teaching, learning and assessment strategies).

Throughout the programme life cycle the quality of teaching and learning is monitored through evaluating: reports of external evaluator – chairman of the State Final Assessment Board; University surveys and questionnaires (student feedback, including module evaluation

questionnaires; feedback from industry subject experts / employers); statistical information, considering issues such as pass rate.

Programme reviews. The University Department of Academic Development conducts an annual monitoring of quality assurance and consequent review of the taught degree programmes, the results of which are considered by the University Education Board headed by the Vice-rector for Education. The programme is further reviewed by the Programme coordinator and Programme team in keeping with the decision and recommendations made.

Module Reviews. All modules are subject to annual review which is initiated and carried out by the lecturer and is normally approved by the Programme Coordinator. New modules or major changes to existing modules (including changes of the title or workload) need to be considered by the Education Board of the Institute of Philology and Cross-cultural Communication and further approved by the University Education Board and University Academic Council.

Student evaluations. All modules and the degree programme are subject to review by evaluations from student questionnaires and feedback from ex-students of the programme. Questionnaires and feedback are mainly channelled via the University Department of Academic Development and Student-Staff committee (Commission for Education Quality). Informal feedback is received at other occasions. The results from student evaluations are considered as part of the annual monitoring of quality assurance and are reported to the appropriate University body or officials.

Employers evaluations. These are received regularly through surveys and questionnaires channelled via the University Department of Academic Development. Informal feedback is received at other occasions.

At the national level an in-depth external review of the programme is undertaken every six years which results in the programme accreditation for another period or abolition of accreditation. The panel of experts is appointed by the Russian Accreditation Agency, located in Moscow. The panel considers documents, meets with current/former students and staff before drawing its conclusions. The final decision on accreditation is made by the Russian Accreditation Agency.

12. Proposed Module Descriptors

Module A: Basic Module

Module Title	Module A: Basic Module							
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)							
ECTS	5 ECTS							
Module Overview	<p>The module consists of two parts: philosophical and linguistic. The aim of the module is to develop ability to critically evaluate theory, principles, methodology. The theories of life origin. Demarcation between life and non-life. Evolution theory and its philosophical basis. Philosophical issues of interaction between humans and the environment. Ecological rights as a type Human rights.</p> <p>The module aims to develop language skills for oral and written presentation of research results and communication with different groups of the population</p>							
Module Learning Outcomes	<ul style="list-style-type: none"> – Being able to critically evaluate theories, concepts and methodologies in the natural Sciences (LO1); – Being able to communicate and cooperate with different kind of people in a multidisciplinary environment (LO8, LO9) 							
Programme LO to which Module LO are mapped	LO1, LO8, LO9							
Teaching and Learning Strategies	<p>The basic educational technologies are the critical thinking development and problem-based learning, with special emphasis on interactive teaching methods. Implementation of this technology includes three stages: challenge - understanding – reflection.</p> <p>The goal of the technology is developing cognitive activity, creativity through case-study and problem solving, and independence of thinking through interactive inclusion into educational process. The aim of the technology is to develop students' ability to raise new questions, develop a variety of arguments designed to make independent decisions, to put forward cognitive tasks</p>							
Assessment Strategies	<p>Assessment strategies are varied and distributed between formative and summative assessment. Formative assessment is built into the learning and teaching process through feedback on completion of individual and group assignments that include essays, reports, presentations, and case-study solving.</p> <p>Summative assessment (credit tests and examination) takes place on completing each unit of the module. Full details are given in the unit specifications below</p>							
Module Units	Code	Title	ECTS	Year/ Semester	Status (M- mandatory; O-optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total
	B1.B.1.1	Philosophical Issues in Natural Science	2	1-st year, Fall	M	24	48	72
B1.B.1.2	Foreign Language	3	1-st year, Fall	M	40	68	108	
Indicative Learning Resources	<p><u>Main resources:</u></p> <ol style="list-style-type: none"> 1. Ladyman, J. Understanding philosophy of Science, 2002, Routledge, London, UK. 2. Losee, J., A Historical Introduction to the Philosophy of Science, 1998, Oxford University Press, Oxford, UK. 3. O'Hear, A. An introduction to the philosophy of Science, 1989, Clarendon Press, Oxford, UK. <p><u>Additional resources:</u></p> <ol style="list-style-type: none"> 1. Gutting, Gary, Continental Philosophy of Science, 2004, Blackwell Publishers, Cambridge, MA. 2. Kuhn, T.S., The Structure of Scientific Revolutions, 1962, Chicago: University of Chicago Press, reprinted,1996. 3. Latour, B., and Woolgar, S., Laboratory Life, The Construction of Scientific Facts, 1979, Princeton: Princeton University Press, 1986. 4. Levin, Michael, "What Kind of Explanation is Truth?" In Jarrett Leplin. Scientific Realism, 1984, Berkeley: University of California Press. pp. 124–1139. 							

5. Michael Friedman, *Reconsidering Logical Positivism*, 1999, New York: Cambridge University Press.
6. Popper, K.R., *The Logic of Scientific Discovery*, K.R. Popper (tr.), 1959, New York: Basic Books.
7. Putnam, Hilary, *Mathematics, Matter and Method (Philosophical Papers, Vol. I)*, 1975, London: Cambridge University Press.
8. Salmon, Merrilee; John Earman, Clark Glymour, James G. Lenno, Peter Machamer, J.E. McGuire, John D. Norton, Wesley C. Salmon, Kenneth F. Schaffner (1992). *Introduction to the Philosophy of Science*. Prentice-Hall.
9. Schlick, M., 1935, "Facts and Propositions," in *Philosophy and Analysis*, M. Macdonald (ed.), New York: Philosophical Library, 1954, pp. 232–236.
10. Van Fraassen, B.C, *The Scientific Image*, 1980, Oxford: Clarendon Press.
11. Ziman, John. *Real Science: what it is, and what it means*, 2000, Cambridge, Uk: Cambridge University Press.
12. Papineau, David. *Science, problems of the philosophy*, 2005, Oxford Companion to Philosophy. Oxford.
13. Worrall, J., 2007. *Why there's no cause to randomize*. *British Journal for the Philosophy of Science*, 58, pp.451-488.

Internet-resources:

1. What Is Time? Michio Kaku's. BBC Documentary. - URL.: <http://www.youtube.com/playlist?list=PL03F2D49431E2A889>
2. Into the Universe. The Story of Everything by Steven Hawking. - URL.: http://www.youtube.com/playlist?list=PLC1cLOJsVfJyFgQYt2paNLOq2u23fq_cq
3. Philosophy and the Sciences. E-course. - URL.: <https://www.coursera.org/course/philsci>

Module B: Mathematical and Instrumental Methods in Ecology and Environmental Management

Module Title	Mathematical and Instrumental Methods in Ecology and Environmental Management							
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)							
ECTS	15 ECTS							
Module Overview	<p>The study subject of this module is based on courses such as «Informatics», «Mathematics», «GIS in ecology and nature».</p> <p>The acquired knowledge is necessary for students to inform management decision-making in the field of natural resources, in the preparation, implementation and protection of the master's thesis, as well as the solution of practical and applied research problems in their future professional or research activities.</p> <p>The objectives of development of the module are:</p> <ul style="list-style-type: none"> – to obtain theoretical and practical knowledge of mathematical and statistical methods of data processing and the nature of various sizes, forming practical skills in the use of specialized software for processing of statistical data; – in the formation of theoretical concepts and practical skills on the formation of models of space-time representation of environmental objects analysis of spatio-temporal data describing environmental objects, the use of geographic information systems, spatial-temporal analysis of data; – in the theoretical knowledge of the mathematical model of the dynamics of biological population, familiarity with the types of models and principles of their construction, methods of investigation of mathematical models, as well as some of the most important mathematical models of biological populations and communities; – in the formation of basic knowledge to optimize the various spheres of ecology and nature, as well as in the formation of practical skills in drafting and formulation of mathematical models of optimization problems in wildlife and ecology, the study of methods to solve these problems known mathematical methods, as well as by means of MS Excel 							
Module Learning Outcomes	<ul style="list-style-type: none"> – Apply a statistic analysis to solve the risk-management problem (LO2; LO6); – Being able to use software for the development adequate solution (LO4, LO5); – Apply of knowledge in practice for solving research problems and being able to conduct independent scientific research in accordance with own programme (LO2, LO4, LO7) 							
Programme LO to which Module LO are mapped	LO2, LO4, LO5, LO6, LO7							
Teaching and Learning Strategies	<p>The organization of educational process, the following educational technology:</p> <ul style="list-style-type: none"> – technology design, creative and research activities, which is to ensure personal - active nature of mastering basic, development and use of their own experience studying a concrete example (Research case); – distance education technology, the goal of which is to provide more opportunities of development given discipline (remote support course) 							
Assessment Strategies	<ol style="list-style-type: none"> 1. Examinations 2. Passed the disciplines module, written task 3. Examination on discipline module 4. The final report and presentation on the results of scientific research practice 							
Module Units	Code	Title	ECTS	Year/ Semester	Status (M- mandatory; O-optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total
	B1.B.2.1	Computer Technologies and Statistical Methods in Ecology and Environmental Management	3	1-st year, Fall	M	40	68	108
B1.B.2.2	Spatial Analysis	3	1-st year, Fall	O	36	72	108	

	B1.Б.2.3	Mathematical Modeling of Ecosystems	3	1-st year, Fall	O	36	72	108
	B2.П.1	Scientific Research Practice	6	1-st year, Fall	O	-	216	216
Indicative Learning Resources	<u>Mandatory reading</u>							
	<ol style="list-style-type: none"> 1. Bezruchko VT Exchange Workshop "Informatics": work in Windows 2000, Word, Excel: Proc. allowance for students. universities, teaching. for tech. and socio-economic. directions and specials. / VT Bezruchko. - 2 nd ed., Revised. and ext. - Moscow: Finance and Statistics, 2005. 2. Gmurman VE Probability theory and mathematical statistics [Text]: studies. allowance for students. Universities / VE Gmurman. - 12 th ed., Revised. - M.: Yurayt 2010. 3. Computer workshop: Textbook. allowance. - M.: ANE 2006. 4. Kremer NS Probability Theory and Mathematical statistics / Probability theory and mathematical statistics: the textbook for students. universities, teaching. on the economy. specialist. / N. S. Kremer. - 3rd ed., Revised. and ext. - Moscow: UNITY 2009. 5. Andreeva EA, NA Shilova. Optimal management of biological communities: a manual / EA Andreeva, NA Shilova; North. (Arctic.) Fader. Univ them. MV Lomonosov. - ID NArFU, 2014. - 204 p. : silt. 6. Ovsyannikova NI The optimal control problem in the epidemic model: a monograph / NI Ovsyannikova; North. (Arctic.) Fader. Univ them. MV Lomonosov. - Arkhangelsk, CPI NArFU, 2012. - 168 p. 7. Polovinkina YS Applications of differential equations [Text]: studies. allowance for students. universities, teaching. by c. Mathematic. and fur. direction. and specials. / S. Polovinkina; Feder. Agency of images., PSU. - Archangel: Pomor University Press, 2007. 8. AF Filippov Introduction to the theory of differential equations [Text]: a textbook for students. universities in c. Physics and Mathematics. eg. and specials. / AF Filippov. - 2nd ed.. - M.: KomKniga 2007. 							
	<u>Recommended reading</u>							
	<ol style="list-style-type: none"> 1. Bart J., Fligner M.A., Notz W.I. Sampling and Statistical Methods for Behavioral Ecologists Cambridge: University Press, 2004. - 352 p. 2. Miller J. Philip. Essential Statistical Methods for Medical Statistics Elsevier B.V. 2011. – 351 p. 3. R. Lyman Ott, Micheal T. Longnecker. An Introduction to Statistical Methods and Data Analysis // Brooks/Cole. 2010. – 1296 p. 4. Campbell, James B. 2011. Introduction to Remote Sensing, 5th edition. New York. The Guilford Press. ISBN 978-1609181765. 5. Maune, D. F., ed. 2007. Digital Elevation Model Technologies and Applications: The DEM Users Manual, 2nd edition. Bethesda, MD.American Society for Photogrammetry and Remote Sensing. ISBN 1-57083-082-7. 6. Congalton, R. and K. Green. 2009. Assessing the Accuracy of Remotely Sensed Data. 2nd edition. CRC Press. ISBN 978-1-4200-5512-2. 7. McGlone, J. C., ed. 2004. Manual of Photogrammetry, 5th edition. Bethesda, Md.: American Society for Photogrammetry and Remote Sensing. ISBN 1-57083-071-1. 8. Wolf, P. and B. Dewitt. 2000. Elements of Photogrammetry, 3rd edition. Boston. McGraw-Hill. ISBN 0-07-292454-3. 9. Zhang H. Sustainable Pavement Asset Management Based on Life Cycle Models and Optimization Methods. A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Natural Resources and Environment) University of Michigan Ann Arbor April 5, 2009. 10. Callum H. Population Parameters: Estimation for Ecological Models Wiley-Blackwell – 2000 – 360 p. 11. Moser, E., Semmler, W., Tragler, G., Veliov, V.M. (Eds.) Dynamic Optimization in Environmental Economics 2014, XI – 355 p. 67 illus. 12. Whittle P. Optimal Control: Basics and Beyond Wiley; 1 edition (July 18, 1996). – 474 13. 							
	<u>Internet resources</u>							
	<ol style="list-style-type: none"> 1. Journals portal «Scopus». URR Access: http://www.scopus.com/ 2. Journals portal «Web of science». URR Access: http://apps.webofknowledge.com/ 3. Journals portal "Scientific Electronic Library Elibrari». URR Access: http://elibrary.ru/ 4. Bosetti V. Optimisation technologies and environmental applications. URL: 							

http://www.carisma.brunel.ac.uk/papers/IMA_VEP.pdf

5. Chih-Sheng Lee. Sustainable Watershed Management by Fuzzy Game Optimization. URL: <http://www.iemss.org/iemss2010/papers/S25/S.25.12.Sustainable%20Watershed%20Management%20by%20Fuzzy%20Game%20Optimization%20-%20CHIH-SHENG%20LEE.pdf>

6. Emilia Kondili. Review of optimization models in the pollution prevention and control. URL: <http://www.nt.ntnu.no/users/skoge/prost/proceedings/escape15/papers/IA-030.pdf>

7. M.G. Erechchoukova Metamodelling in sustainable environmental Management. URL: <http://www.mssanz.org.au/modsim2011/E10/erechchoukova.pdf>

8. Maureen C. Kennedy and other. Informed multi-objective decision-making in environmental management using Pareto optimality // Journal of Applied Ecology 2008, 45, - p.181–192 (<http://naldc.nal.usda.gov/download/14553/PDF>)

Module C: Environmental Law

Module Title	Environmental Law							
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)							
ECTS	10 ECTS							
Module Overview	<p>This module dedicated to main theoretical and practical problems of national and international environmental law. Questions of the legal regulation of relations understanding in the sphere of environmental protection, environmental management relations, ownership of natural objects and resources, relations of protection of the rights and legitimate interests of individuals and entities.</p> <p>The module consists of four units taught in sequence in the first year of study: system of environmental law, environmental law of Russian Federation, international environmental law, environmental law and indigenous peoples rights.</p> <p>Students have to examine national and international sources on environmental law.</p> <p>The emphasis is made on developing critical thinking, practical strategies and creativity in relation to a wide range of problematic situations</p>							
Module Learning Outcomes	<p>Upon successful completion of this course students should be able to:</p> <ul style="list-style-type: none"> – demonstrate their knowledge of the main dimensions of International Environmental Standards and the application of it in the Arctic Region, classify ecological human rights (LO1); – reflect on and analyze International and Russian domestic law with respect to the Arctic area (LO4); – know the fundamental principles of international law and the specific international environmental law principles (LO5); – orientate in the primary major and additional sources of environmental law branch(LO5); – explain the norms of international declarations, conventions and treaties concerning environmental protection (as the Stockholm Declaration of the UN Conference on the Human Environment (1972) and The Rio Declaration on Environment and Development (1992) and etc.) (LO9); – aware of particularities of separate components of the environmental protection and the role of the Arctic indigenous peoples communities in protection of the Environment (LO10) – formulate the significance of international organizations (governmental and nongovernmental) (LO9) – Define the compensation for environmental harm under Russian law (LO4, LO5, LO10) 							
Programme LO to which Module LO are mapped	LO1, LO4, LO5, LO9, LO10							
Teaching and Learning Strategies	<p>Teaching is conducted through interactive lectures, practical works.</p> <p>Students are encouraged to actively participate in group discussions, critically analyze of legal sources, scientific theories and legal cases, apply theoretical knowledge and practical skills to analyze legal material.</p> <p>Before each practical lesson, the students are required to read selected course literature and legal sources.</p> <p>All teaching is conducted in English</p>							
Assessment Strategies	<p>Assessment strategies are varied and distributed between formative and summative assessment.</p> <p>Formative assessment is built into the learning and teaching process through feedback on completion of individual and group assignments which include essays, reports, presentations.</p> <p>Summative assessment (credit tests and examination) takes place on completing each unit of the module. Full details are given in the unit specifications below</p>							
Module Units	Code	Title	ECTS	Year/ Semester	Status (M- mandatory; O-optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total
	Б1.Б.ОД.1.1	Environmental Law System	4	1, fall	O	48	96	144
	Б1.Б.ОД.1.2	Environmental Law of the Russian Federation	2	1, fall	O	24	48	72
Б1.Б.ОД.1.3	International	2	1, fall	O	24	48	72	

		Environmental Law						
	Б1.Б.ОД.1.4	Environmental Law and Indigenous Peoples Rights	2	1, fall	O	24	48	72
Indicative Learning Resources	<p><u>Mandatory reading</u></p> <ol style="list-style-type: none"> 1. The Stockholm Declaration of the Human Environment, 1972 2. The Rio Declaration on Environment and Development, 1992 3. Convention on Environmental Impact Assessment in a Transboundary Context, 1991 4. Philippe Sands. Principles of International Environmental Law. Textbook. (2nd Edition). - University College London, October, 2003. 5. Documents in International Environmental Law. Edited by Philippe Sands, Paolo Galizzi. - University of London, Published May 2004. 6. Dejeant-Pons M & Pallemarts M. Human Rights and the Environment. - Council of Europe Publishing, 2002. 7. Alexander Kiss, Dinah Shelton. Manual of European Environmental Law. - Cambridge University Press), 1997. 8. Polar Law Textbook / Ed. Be N. Loukasheva Copengagen, 2010 <p><u>Internet resources</u></p> <ol style="list-style-type: none"> 1. www.epa.gov 2. www.narf.org 3. www.un.org 4. www.ats.aq 5. www.arctic-council.org 6. www.ecolex.org 							

Module D: Environmental monitoring

Module Title	Environmental monitoring							
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)							
ECTS	15 ECTS							
Module Overview	<p>This module focuses on the fundamental theories of modern ecology and environmental chemistry as a basis for understanding the main processes in the arctic ecosystems under the influence of anthropogenic impact.</p> <p>The module provides an introduction to the challenges what the responses occur under the influence of pollution on ecosystems in northern latitudes.</p> <p>The course focuses on the study of the current state of the biosphere and chemical pollution of the Arctic ecosystems. Basis chemical analysis of different environments will be discussed</p>							
Module Learning Outcomes	<ul style="list-style-type: none"> – Systemic understanding the main sources of anthropogenic pressures on the Arctic environment, the diagnose ability of environmental problems in the Arctic and developing the practical recommendations on the protection and sustainable development of Arctic ecosystems (LO1, LO4, bLO9) – Systematic understanding of the theory and operation of environmental monitoring, process cycle of environmental analytical control of environmental pollution with the ability to independently and creatively apply theoretical knowledge in practice (LO2, LO4, LO6, LO7) – Possession skills in using the modern methods of processing and interpretation the environmental information to the assessment of the obtained results (LO2, LO4, LO6) 							
Programme LO to which Module LO are mapped	LO1, LO2, LO4, LO6, LO7, LO9							
Teaching and Learning Strategies	<p>Several teaching methods are employed, including lectures, seminars, laboratory work, computer lab and field courses.</p> <p>Students are encouraged to actively participate in group discussions, lab / field work, critically analyze current literature.</p> <p>Before each practical/lab, the students are required to read selected course literature</p>							
Assessment Strategies	<p>Assessment strategies are varied and distributed between formative and summative assessment.</p> <p>Formative assessment is built into the learning and teaching process through feedback on completion of individual and group assignments which include essays, reports and presentations.</p> <p>Summative assessment (credit tests and examination) takes place on completing each unit of the module. Full details are given in the unit specifications below</p>							
Module Units	Code	Title	ECTS	Year/ Semester	Status (M- mandatory; O-optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total
	Б1.Б.ОД.2.1	Priority pollutants of the Arctic territories	3	1-st year, Spring	M	36	72	108
	Б1.Б.ОД.2.2	Environmental pollution assessment	3	1-st year, Spring	M	36	72	108
	Б1.Б.ДБ.1.1	Environmental risks in the Arctic Region	3	1-st year, Spring	E	36	72	108
	Б1.Б.ДБ.1.2	Contemporary phisico-chemical methods of environmental risk reduction	3	1-st year, Spring	E	36	72	108
	Scientific research practice	6	1-st year, Spring	O	0	216	216	
Indicative Learning Resources	<p>Mandatory reading</p> <ol style="list-style-type: none"> 1. Lichtfouse E., Schwarzbauer J., Robert D. Environmental Chemistry for a Sustainable World. Volume 2: Remediation of Air and Water Pollution. – Springer Link, 2012. – 548 p. Retrieved from http://link.springer.com/book/10.1007/978-94-007-2439-6 – 27.05.2014. 2. Manahan S.E.. Environmental Chemistry. CRC Press. 2004. ISBN 1-56670-633-5. 							

3. Venetsianov E.V., Vinichenko V.N., Gouseva T.V., Dayman S.Y., Zaika E.A., Molchasnova Y.P., Sournin V.A., Khotuleva M.V and others. Environmental Monitoring: Step by Step. — M.: D.I.Mendelev RKhTU, 2003. — 252 pp.

Recommended reading

1. Csuros, Csaba; Csuros, Maria (2002). Environmental sampling and analysis for metals. Boca Raton, FL: CRC Press. — 219 p. Retrieved from: <http://link.springer.com/book/10.1007/978-3-540-49856-8> — 27.05.2014.

2. Quante M., Ebinghaus R., Flöser G. Persistent Pollution – Past, Present and Future. – Springer Link, 2011. – 417 p. Retrieved from <http://link.springer.com/book/10.1007/978-3-642-17419-3> — 27.05.2014.

4. Alloway B. (Ed.) Heavy Metals in Soils. Trace Metals and Metalloids in Soils and their Bioavailability. – Springer Link, 2013. – 613 p. Retrieved from <http://link.springer.com/book/10.1007/978-94-007-4470-7> — 27.05.2014.

3. Johannessen O., Volkov V., Pettersson M.. Radioactivity and Pollution in the Nordic Seas and Arctic Region. Observations, Modeling, and Simulations. – Springer Link, 2010. – 215 p. Retrieved from: <http://link.springer.com/book/10.1007/978-3-540-49856-8> — 27.05.2014.

4. OECD (1999) Environmental Performance Review of Russia. <http://www.oecd.org/dataoecd/8/60/1962933.pdf>

5. Kim Y., Platt U. (Eds.) Advanced Environmental Monitoring. – Springer Link, 2008. Retrieved from: <http://link.springer.com/book/10.1007/978-1-4020-6364-0> — 27.05.2014.

6. Global Environment Monitoring System. (2011). The world of water quality. Retrieved from <http://www.gemswater.org/index.html>

Internet resources

1. World Wildlife Found. The Arctic. Retrieved from http://wwf.panda.org/what_we_do/where_we_work/arctic/

2. National Oceanic and atmospheric Administration. Arctic Theme Page. <http://www.arctic.noaa.gov/pollution.html>

3. Arctic Monitoring and Assessment Programme. <http://www.amap.no/>

4. Global Environmental Monitoring System. <http://www.gemstat.org>

5. Arctic Photo. Arctic Pollution. <http://www.arcticphoto.co.uk/pollution.asp>

Module E: Environmental Management and Nature Protection

Module Title	Environmental Management and Nature Protection							
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)							
ECTS	15 ECTS							
Module Overview	<p>This module is aimed at research in the field of environmental management system and at exploration the process of creating the basic principles of the enterprise management system for safety nature. Study tools and methods of creating management system. Analyses in the planning, design and the operation phase management system. Use of experience, accept criteria, decision process. Planning and practical methods for decisions in the field of environmental safety.</p> <p>Research practice includes project decisions, which implies a permanent presence in the process of generating ideas. At the end of practice, the student must submit a report with an assessment of the effectiveness and the formulation of recommendations on optimization of management system</p>							
Module Learning Outcomes	<p>On completing the module students will be able to:</p> <ul style="list-style-type: none"> – Demonstrate understanding of basic principles the enterprise management system and being able to create decision to the development of more adequate solutions (LO1, LO4); – Being able to apply various methods to assess management system (LO6); – Plan and implement an independent research project in the management system (LO7) – Being able to seek optimal solutions problems for the environment protection (LO5); – Being able to cooperate in a multidisciplinary environment and understanding of social responsibilities related to the nature protection (LO9, LO10) 							
Programme LO to which Module LO are mapped	LO-1; LO-4; LO5; LO-6; LO-7; LO-9; LO-10							
Teaching and Learning Strategies	<p>Teaching is conducted through interactive lectures, practical's works.</p> <p>Students are encouraged to actively participate in group discussions, critically analyze current theories and practices of environmental management system from different countries, apply theoretical knowledge and practical skills to design and interpret knowledge in environmental management fields of Arctic Region.</p> <p>Students have the opportunity to observe European experience in various contexts (by watching video lessons) and undertake microteaching practice.</p> <p>Before each practical/lab, the students are required to read selected course literature.</p> <p>All teaching is conducted in English</p>							
Assessment Strategies	<p>Assessment strategies are varied and distributed between formative and summative assessment.</p> <p>Formative assessment is built into the learning and teaching process through feedback on completion of individual and group assignments which include essays, reports, presentations, lesson plans and practice.</p> <p>Summative assessment (credit tests and examination) takes place on completing each unit of the module. As a final control for module teacher offers protection of student's project. Full details are given in the unit specifications below</p>							
Module Units	Code	Title	ECTS	Year/ Semester	Status (M- mandatory; O-optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total
	Б1.В.ОД.3.1	Environmental Management System	3	1-st year, Spring	M	36	72	108
	Б1.В.ОД.3.2	Corporate Environmental Management System	3	1-st year, Spring	O	36	72	108
	Б1.В.ДВ.2.1	Management Decisions in the Field of Environmental Safety	3	1-st year, Spring	E	32	76	108
	Б1.В.ДВ.2.2	Sustainable	3	1-st year,	E	32	76	108

		Development of Russian Industry		Spring				
	Б2.П.3	Scientific Research Practice	6	1-st year, Spring	O	0	216	216
Indicative Learning Resources	<p><u>Mandatory reading</u></p> <ol style="list-style-type: none"> 1. Environmental management systems and certification. Philip Weiss and Jorg Bentlage. Baltic University Press, 2007. 266 pages. 2. A Handbook of Environmental Management Edited by Jon C. Lovett, David G. Ockwell (2010). Edward Elgar Publishing Limited, UK. 471 p. 3. Economic Development and Environmental Sustainability. New Policy Options. (2006) Edited by Ramyn Lypez and Michael A. Toman. Oxford University Press, 486 p. 4. Environmental Management Systems. A Guidebook for Improving Energy and Environmental Performance in Local Government (2004) Prepared by Five Winds International. 244 p. <p><u>Recommended reading</u></p> <ol style="list-style-type: none"> 1. Tage Sundström and Lars Rydén. The prospect of sustainable development: Environmental Science. Baltic University Press, Uppsala. 2003. 778p. 2. Cleaner Production – Technologies and Tools for Resource Efficient Production Lennart Nilsson, Per-Olof Persson, Lars Rydén, Siarhei Darozhka, and Audrone Zaliauskiene. Baltic University Press, 2007. 324 pages 3. Product Design and Life Cycle Assessment. Ireneusz Zbicinski, John Stavenuiter, Barbara Kozlowska, and Hennie van de Coevering. Baltic University Press, 2007. 312 p. 							

Module F: Risk Management

Module Title	Risk Management							
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)							
ECTS	15 ECTS							
Module Overview	<p>Module consists of two parts. The aim of first part is to acquaint students with the basic aspects of risk management in organizations, give an idea of the possible elimination of environmental risks. Theoretical and methodological bases of risk management; theoretical and practical bases of design, implementation and monitoring of the risk management system. Methods of evaluating the level of adverse effects on the environment, methods of qualitative and quantitative environmental risk assessment of various factors; management practices and minimize the environmental risks.</p> <p>Part two of the module is Research practice. The aim of Research practice is to develop and consolidate skills management of environmental risks. The formation and development of practical skills and competencies of the master, independent vocational activity experience. Research practice consists of individual creative assignments on the theme of scientific research programs, decisions of a significant number of private tasks, which implies a permanent presence in the process of generating ideas. At the end of practice, the student must submit a report with an assessment of the effectiveness of risk management and the formulation of recommendations on optimization of risk-management</p>							
Module Learning Outcomes	<p>On completing the module students will be able to:</p> <ul style="list-style-type: none"> – Being able to create a model of environmental risk management in the company (LO2); – Being able to implement the methods of risk management monitoring systems (LO3); – Being able to seek solutions in evaluating the level of adverse effects on the environment (LO5); – Being able to cooperate in teams while doing qualitative and quantitative environmental risk assessment of various factors; management practices and minimize the environmental risks a multidisciplinary environment risk management (LO7, LO9) – Having a proper understanding of social responsibilities related to the management practice of minimizing of environmental risk (LO10) 							
Programme LO to which Module LO are mapped	LO2, LO3, LO5, LO7, LO9, LO10							
Teaching and Learning Strategies	<p>Teaching is conducted through interactive lectures and practical works.</p> <p>Teaching strategy is realized through the following technologies:</p> <p>Technology development of critical thinking and problem-based learning; The technology of developing training; The technology of differentiated instruction; Contextual learning technology; Technology project management, creative and research</p> <p>All teaching is conducted in English</p>							
Assessment Strategies	<p>Written exam Written exam includes tests and problem's solving</p> <p>Research practice - Set-off . According to the results of scientific research practice student should prepare a detailed written report. To a obligatory report attached diary research practices, signed and the leader of the Magister, as well as documents that contain information about the results of the student in the period of scientific research practice. Report on research practice Masters must be approved by the supervisor of graduate students and then it can get. For the successful defense of the report on research practice of undergraduate must prepare and submit to the presentation of the results of the study, as well as abstracts</p>							
Module Units	Code	Title	ECTS	Year/ Semester	Status (M- mandatory; O-optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total
	Б1.Б.ДБ.3.1	Risk management	9	2-nd year, Fall	O	124	200	324
Б2.П.4	Research practice	6	2-nd year, Fall	O	0	216	216	
Indicative Learning Resources	<p><u>Main resources:</u></p> <p>1. Hardisty, Paul E. Environmental and economic sustainability / Paul E. Hardisty (Environmental and ecological risk assessment). - London – New York: CRC Press, 2012. – 315 p.</p>							

2. Economics and Ecological Risk Assessment: Applications to Watershed Management (Environmental and Ecological Risk Assessment) // Edited by Randall J.F. Bruins, Matthew T. Heberling. – CRC Press, 2013.

3. Jesse Russell. Enterprise risk management. – М.: Книга по требованию, 2013. – 110 p.

4. Jesse Russel. Strategic environmental assessment. – М.: Книга по требованию, 2012. – 130 p.

Additional resources:

1. Principles of Corporate Finance +Connected Plus . Richard A Brealey, Stewart C. Myers. The Mc-Grow Hill companies ,2011 Burgman Mark. Risks and Decisions for Conservation and Environmental Management. – New York: Cambridge University Press, 2013. – 502 p.

2. John C. Pine. Natural Hazards Analysis. – London – New York: CRC Press, 2012. – 314 p.

3. Lawrence V. Tannenbaum. Alternative Ecological Risk Assessment. – Wiley Blackwell, 2013. – 228 p.

Internet-resources:

1. <http://www.coso.org/>

2. 5. <http://www.ferma.eu/>

Module G: Cleaner Production Technologies

Module Title	Cleaner Production Technologies							
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)							
ECTS	15 ECTS							
Module Overview	<p>Active development of the Arctic has led to increased demand for specialists who are able to work effectively in a harsh weather conditions. That is why The Master program "Management of ecological risks in the Arctic" will be in the modern education system.</p> <p>Objectives of the module is to acquaint students with the basic theoretical and practical peculiarities of environmental and quality control management</p>							
Module Learning Outcomes	<ul style="list-style-type: none"> – Know the basic documents regulating the process of certification and standardization of products (LO2). – Be able to take measures prevent, control and eliminate the consequences of pollution (LO3, LO5, LO6). – Be able to organize and manage of research, production and expert-analytical work based on deep knowledge in the field of environmental management (LO3, LO7, LO10); – Be able to implement the ecological management system in all stages product production, to recognize the marks of different eco-standards and see the mistakes in environmental management (LO2, LO3, LO5, LO6) 							
Programme LO to which Module LO are mapped	LO2, LO3, LO5, LO6, LO7, LO10							
Teaching and Learning Strategies	<p>Module "Cleaner Production Technologies" is professional type and discipline of choice. Module «Cleaner Production Technologies » is based on Module «Risk management», Module «Management of Natural Resources and Environment», and knowledge in economic & ecology. Module «Cleaner Production Technologies » creates a theoretical and practical basis for the passage of the research practice and writing a thesis.</p> <p>The lectures includes of video and visual presentations. The practical classes consists of discussion and work on common projects. Also students are involved in scientific conferences</p>							
Assessment Strategies	<p>The exams and assessment methods vary between written exams, case study analysis and project work.</p> <p>The final grade consists of grade from exam, grade for class work</p>							
Module Units	Code	Title	ECTS	Year/ Semester	Status (M- mandatory; O- optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total
	Б1.В.ДВ.4.1	Cleaner Production Technologies	9	Autumn/ third semester	O	94	230	324
	Б2.П.5	Scientific Research Practice	6	Autumn/ third semester	O	0	216	216
Indicative Learning Resources	<p>Mandatory reading</p> <ol style="list-style-type: none"> 1. Alazzani, A. & Wan-Hussin W. N. (2013) Global Reporting Initiative's environmental reporting: A study of oil and gas companies, Ecological Indicators, Vol 32, p 19-24. 2. Morrow, D., Rondinelli, D. (2002) Adopting Corporate Environmental Management Systems: Motivations and Results of ISO 14001 and EMAS Certification, European Management Journal Vol. 20, No. 2, pp. 159–171. 3. Fontn, X (2002) Environmental certification in tourism and hospitality: progress, process and prospects, Tourism Management Vol 23 197–205. 4. Vilen, A. & Aarsaether, N. (2013) Transforming an Iconic Attraction into a Diversified Destination: The Case of North Cape Tourism, Scandinavian Journal of Hospitality and Tourism, Vol. 13: 1, pp. 38-54. 5. Wang, S (2004) One hundred faces of sustainable forest management, Forest Policy and Economics. Vol 6, pp. 205–213. 6. Karlsen, K. M., Hermansen, Ø., Dreyer, B. M. (2012) Eco-labeling of seafood: Does it affect the harvesting patterns of Norwegian fishermen?, Marine Policy Vol 36, pp. 1123– 							

1130.

7. Dekker, M., Turnhout, E., Bauwens, B.M.S.D.L., Mohren G.M.J. (2007) Interpretation and implementation of Ecosystem Management in international and national forest policy, *Forest Policy and Economics*. Vol 9, pp. 546–557.
8. Fonseca , A., McAllister , M. L., Fitzpatrick, P. (2012) Sustainability reporting among mining corporations: a constructive critique of the GRI approach, *Journal of Cleaner Production* (2012), pp. 1-14

Research Module

Module Title	Research							
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)							
ECTS	24 ECTS							
Module Overview	<p>This module relates specifically to classroom-based or laboratory-based research in ecology and environmental risk management. This study encourages students to exercise an enquiring approach in their future career, to contribute to new thinking and innovation processes in environmental risk assessment.</p> <p>The module aims at training students to plan, design and implement research as well as in group and individual work in all phases of research, including the writing and defense of a thesis. Emphasis is placed on the development of critical thinking, practical strategies and creativity in the field of research and new situations</p>							
Module Learning Outcomes	<p>On completing the module students will be able to:</p> <ul style="list-style-type: none"> – Distinguish between quantitative and qualitative methods of research. Utilise a range of tools and techniques for statistical analysis of data (LO6); – Develop skills for effective using various methods in environmental risk assessment (LO2, LO6); – Design, develop and implement stages of preventing ecological risks in accordance with ethical norms (LO5, LO10); – Undertake independent research: formulate research objectives, apply appropriate research methods and carry out research, handling the data and presenting research findings (LO7); – Gather, analyse, critically systematize and interpret the information from theoretical sources and empirical data (LO1, LO7); – Communicate to colleagues and laymen about research issues (LO-8) 							
Programme LO to which Module LO are mapped	LO1; LO2; LO5; LO6; LO7, LO-8, LO-10							
Teaching and Learning Strategies	<p>The module include students' independent research work conducted under the guidance of individual dissertation supervisors and research practice period.</p> <p>Students are required to undertake research projects for their dissertations in which they are to develop and use the research skills and a number of transferrable skills (analyse information and database, problem solving, computing skills, etc.).</p> <p>Tutorials on writing research proposals, research design, data collection and analysis are provided by individual dissertation supervisors.</p> <p>Development of student's academic discourse is implemented through critical reading and dissertation supervisor's feedback on students' written work.</p> <p>The module is highly interactive: students present and discuss in groups and with dissertation supervisors their current work, issues and problems, and their plans for their thesis; there is much discussion of open questions, problems, methodological issues, research methods, etc.</p> <p>All teaching is conducted in English</p>							
Assessment Strategies	<p>Students are assessed by credit tests in each unit of the module through written and oral assignments which constitute essential parts of their research: list of proposed bibliography; a research proposal/ pre-prospectus; a literature review; a description of proposed research methodology; a prospectus (proposed summary of the dissertation); a research article; participation in peer-review of students' research articles; presentation of research findings for the conference of young researchers.</p> <p>Feedback on progression of individual students with their research is provided by individual dissertation supervisors throughout the whole degree programme period.</p> <p>Full details are given in the unit specifications below</p>							
Module Units	Code	Title	ECTS	Year/Semester	Status (M/O/E) (M- mandatory; O-optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total

	B2.H1	Independent research work on Master's thesis.	18	2-nd year, Spring	O	0	628	648
	B2.II.6	Research Practice Period	6	2-nd year, Spring	O	0	216	216
Learning Resources	<p><u>Recommended reading:</u></p> <ol style="list-style-type: none"> 1. Randolph, Justus (2009). A Guide to Writing the Dissertation Literature Review. <i>Practical Assessment, Research & Evaluation</i>, 14(13). Available online: http://pareonline.net/getvn.asp?v=14&n=13. 2. Cohen, Louis. Research methods in education / Louis Cohen, Lawrence Manion, and Keith Morrison.—5th ed. NY. 2005. <p><u>Internet Resources:</u></p> <ol style="list-style-type: none"> 1. Randolph, Justus (2009). A Guide to Writing the Dissertation Literature Review. <i>Practical Assessment, Research & Evaluation</i>, 14(13). Available online: http://pareonline.net/getvn.asp?v=14&n=13. 2. Drowne, K. (2012). Best Practices for Writing Your Master's Thesis. Missouri University of Science and Technology. Retrieved from: https://justwrite.mst.edu/files/2013/08/Best-Practices-for-Writing-Your-Masters-Thesis.pdf 3. Mongan-Rallis, H. (2014). Guidelines for writing a literature review. Retrieved from: http://www.duluth.umn.edu/~hrallis/guides/researching/litreview.html 4. Cronon, W. Writing a research prospectus. Retrieved from: http://www.williamcronon.net/handouts/Writing_A_Research_Prospectus.pdf 5. Example Prospectus: University of Southern Mississippi. Retrieved from: https://www.usm.edu/honors/example-prospectus 							

Module Final State Certification

Module Title	Final State Certification
Degree Programme	05.04.06 Ecology and Environmental Management: Environmental Risk Management in the Arctic (ERMA)
ECTS	6 ECTS
Module Overview	This module includes students' preparation for and the process of state final assessment which is implemented on the basis of student's master dissertation and its presentation to the Final Assessment Board.
Module Learning Outcomes	On completing the module students will be able to demonstrate: <ul style="list-style-type: none"> – Capacity to develop and conduct independent own research (LO6, LO7); – Ability to present, report and communicate the research process and findings in an appropriate format to specialist and non-specialist audiences (LO8); – Ability to analyse and reflect upon theoretical and practical issues reflected in the research and its implications for the environment (LO2; LO4; LO5, LO10)
Programme LO to which Module LO are mapped	LO2; LO4; LO5; LO6; LO7; LO8; LO10
Teaching and Learning Strategies	The procedures of the dissertation delivery and defence are regulated by the University Guidelines for Masters Degree Programmes (Rector's Order № 616, dd. 19.06.2013) (http://narfu.ru/upload/iblock/917/polozhenie-o-magistrature_-utv.prikazom-ot-19.06.2013--616.pdf) Teaching and Learning methodologies include: <ul style="list-style-type: none"> – Students' independent self-directed work; – Guidance by an individual dissertation supervisor (tutorials, Skype, e-mail); – Review of the dissertation by an appointed reviewer
Assessment Strategies	Students are assessed by the Final Assessment Board on the basis of: <ul style="list-style-type: none"> – Written dissertation properly organized and bound in accordance with the University Guidance; – Oral presentation of the dissertation by the student and discussion of the research findings with the members of the Final Assessment Board. Proposed Assessment Criteria: <ol style="list-style-type: none"> 1. <u>Independent scientific thinking /originality</u> <ul style="list-style-type: none"> – Does the candidate use and develop original ideas? – Are the core findings presented in clear statements? – Does the thesis incorporate critical appraisal? 2. <u>Methodology</u> <ul style="list-style-type: none"> – Does the candidate show sufficient familiarity with current knowledge (literature, experiments)? – Are the methods and techniques used properly described? – Are the methods adopted appropriate to the subject matter? – Has the research been carried out carefully and adequately? 3. <u>Structure and scientific argumentation</u> <ul style="list-style-type: none"> – Is the exposition of the topic clear? – Are the aims logically stated? – Does the thesis include clearly formulated hypotheses? – Does the structure of the thesis show a logical approach to the topic? – Are the results of the research and conclusions clearly and logically presented? – Have the central questions been answered? – Are the results placed in a broader context? – Are the facts clearly distinguishable from hypotheses and suppositions? – Are proposals made for subsequent research projects? 4. <u>Form and presentation</u> <ul style="list-style-type: none"> – Is there a comprehensive, informative abstract?

- Is the text scientifically correct, clearly understandable and in a grammatically sound language?
- Have the formal requirements for diagrams, tables, literary sources etc. been met?

Marks or grades are awarded on the following principles:

- Excellent, far above average, among the best 10% (grade 5);
- Good, slightly above or within average, certain flaws (grade 4);
- Satisfactory, below average, several obvious flaws (grade 3);
- Unsatisfactory, well below average, serious flaws (grade 2)

Indicative students workload	Code	Title	ECTS	Year/ Semester	Status (M/O/E) (M- mandatory; O-optional; E-elective)	Indicative Study Hours		
						Directed	Self-Directed	Total
	Б.3	Final State Certification	6	2-nd year, Spring	M	0	216	216

13. Key Sources of Information about the Programme

In addition the information about the Programme can be found at:

www.narfu.ru

http://www.narfu.ru/en/studies/degree_programs/erma/

Attachment A:

The Matrix of the intended programme learning outcomes aligned to the EQF and NQF

European Qualifications Framework (EQF), Level 7, Master	National Qualification framework of Ireland, Level 9, Master	National Qualification framework of RF (NQF), Level 7, Master	Programme Learning Outcomes
Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research	<u>Knowledge (breadth):</u> A systematic understanding of knowledge at the forefront of a field of learning	<u>Характер знаний:</u> Понимание методологических основ деятельности. <i>Deep understanding of methodological grounds of professional activity.</i> Определение источников и поиск информации, необходимой для развития области профессиональной деятельности и /или организации <i>Capable of selecting sources and searching for information necessary for further development of professional activities and/or company</i>	LO1: Demonstrate in-depth knowledge and critical understanding of theories, principles, concepts and methodologies in domain of the environmental risks management
Critical awareness of knowledge issues in a field and at the interface between different fields	<u>Knowledge (kind):</u> critical awareness of current problems and new insights, generally informed by the forefront of a field of learning	<u>Характер знаний:</u> Создание новых знаний прикладного характера в определенной области и/или на стыке областей. <i>Capable of creating new applied knowledge in a certain field or at the interfaces of different fields.</i>	LO2: Being able to deal with complex problems in the environmental risk management. LO3: Being able to comprehend and interpret the theoretical development
Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	<u>Know-how and skill (range):</u> Demonstrate a range of standard and specialized research or equivalent tools and techniques of enquiry. <u>Know-how and skill (selectivity):</u> Select from complex and advanced skills across a field of learning; Develop new skills to a high level, including novel and emerging techniques	<u>Характер умений:</u> Решение задач развития области профессиональной деятельности и (или) организации с использованием разнообразных методов и технологий, в том числе, инновационных. <i>Capable of achieving development goals in the field of professional activity by employing new methods and approaches including innovative ones.</i> Разработка новых методов, технологий и т.п. <i>Develop new methods, approaches and technologies</i>	LO4: Being able to reflect on the own way of thinking and working and being able to translate that reflection to the development of more adequate solutions. LO5: Being able to seek solutions meaning analysing and defining complex problems related to the professional practice and being able to develop and apply meaningful strategies to come to a solution of risk management problems. LO6: Being able to apply various methods to assess environment risks
Manage and transform work or study contexts that are complex, unpredictable and require new strategic	<u>Competence (context):</u> Act in a wide and often unpredictable variety of professional levels and ill-defined contexts.	<u>Широта полномочий и ответственность:</u> Определение стратегии, управление процессами и деятельностью (в том числе	LO7: Plan and implement an independent research project in the system of the environmental risks management in the Arctic

approaches	<u>Competence (insight):</u> Scrutinise and reflect on social norms and relationships and act to change them	инновационной) с принятием решения на уровне организаций или подразделений крупных институциональных структур. <i>Define strategy, manage processes and activities (including innovative ones), make decisions at the level of institutional structures and their subdivisions</i>	
Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams	<u>Competence (role):</u> Take significant responsibility for the work of individuals and groups; Lead and initiate activity. <u>Competence (learning to learn):</u> Learn to self-evaluate and take responsibility for continuing academic/professional development	<u>Широта полномочий и ответственность:</u> Ответственность за результаты деятельности организаций или подразделений крупных институциональных структур. <i>Take responsibility for the performance results of organizations or subdivisions making constituent parts of large-scale institutional structures</i>	LO8: Being able to communicate the own experiment and solutions to colleagues and laymen. LO9: Being able to cooperate in a multidisciplinary environment. LO10: Having a proper understanding of social responsibilities related to the professional practice

Attachment B:

Graduate competency as prescribed by Federal State Educational Standard for Higher Education (05.04.06 Master's level, Ecology and Environmental Management)

Key Competences / KC (Общекультурные компетенции / ОК)
<ul style="list-style-type: none">- the ability to abstract thinking, analysis, synthesis (KC-1)- the willingness to act in unusual situations, carry the social and ethical responsibility for decisions (KC-2)- the willingness to self-development, self-realization, the use of creative potential (KC-3)
Generic Professional Competences /GPC (Общепрофессиональные компетенции / ОПК)
<ul style="list-style-type: none">- use knowledge of philosophic concepts of natural science and methods of scientific cognition when studying different levels of matter, space and time (GPC-1);- the ability to apply modern computer technology in the collection, storage, processing, analysis and transfer of geographic information and for solving research and production and technological challenges of professional activity (GPC-2);- the ability to actively communicate in scientific, industrial and social and public spheres (GPC-3);- the ability to use the state language of the Russian Federation and a foreign language as a means of business communication (GPC-4);- the ability to active social mobility (GPC-5);- the possession of methods for assessing representativeness of the material, the volume of samples when conducting quantitative research, statistical methods of comparing data and identifying patterns (GPC-6);- the ability to use depth knowledge of the legal and ethical norms in the assessment of the impact of their professional activities, the development and implementation of social projects and to use in practice skills and abilities in the organization of research and scientific-production work in the management research team (GPC-7);- the willingness to independent research work and the work of the scientific team, the ability to generate new ideas (creativity) (GPC-8);- the willingness to lead a team in their professional activity, tolerant perceiving social, ethnic, religious and cultural differences (GPC-9)
Professional competences / PC: Core (Профессиональные компетенции / ПК: основной вид деятельности)
<ul style="list-style-type: none">- the ability to formulate problems, tasks and methods for scientific research; to get new reliable facts based on observations, experiments, scientific analysis of empirical evidence; to make science work annotations; to compose analytical reviews accumulated in the world science and work activity; to sum up the results based on the existing scientific knowledge; to formulate conclusions and practical recommendations based on the representative and original research findings (PC-1);- the ability to creatively use in scientific and technological activities of production and knowledge of basic and applied sections special disciplines master program (PC-2);- possession of the design basics, expert-analytical activities and perform research using modern approaches and methods, equipment and computer systems (PC-3);- the ability to apply contemporary methods of ecological information processing and interpretation when conducting scientific and production research (PC-4)
Professional competences / PC: Non-core (Профессиональные компетенции / ПК: дополнительный вид деятельности)
<ul style="list-style-type: none">- the ability to develop standard environmental protection measures; assess the impact of the planned construction or other forms of economic activity on the environment (PC-5);- ability to determine and diagnose environmental problems, to work out practical recommendations on environmental protection and sustainable development (PC-6);- the ability to apply knowledge of regulatory documents which determine organization of production and technical environmental work, to plan audit check, control over compliance with environmental requirements, environmental management and production processes, choosing adequate methodology (C7);

- the ability to carry out the organization and management of research and scientific production and expert-analytical work with in-depth knowledge in the field of environmental management (PC-9)

Attachment C:**Matrix of the Intended programme learning outcomes aligned to the FSES-HE (05.04.06 Master's level, Ecology and Environmental Management) requirements to graduates competency**

Intended Programme Learning Outcomes	HES-established competences
LO1: Demonstrate in-depth knowledge and critical understanding of theories, principles, concepts and methodologies in domain of the environmental risks management.	KC-1, GPC-1, PC-2
LO2: Being able to deal with complex problems in the environmental risk management.	KC-2, GPC-6, GPC-7, PC-7, PC-9
LO3: Being able to comprehend and interpret the theoretical development	KC-1, GPC-6, GPC-7, PC-2, PC-5
LO4: Being able to reflect on the own way of thinking and working and being able to translate that reflection to the development of more adequate solutions.	KC-2, GPC-7, PC-6, PC-7, PC-9
LO5 Being able to seek solutions meaning analysing and defining complex problems related to the professional practice and being able to develop and apply meaningful strategies to come to a solution of risk management problems	GPC-6, PC-1, PC-3, PC-4, PC-9
LO6: Being able to apply various methods to assess environment risks.	GPC-2, GPC-6
LO7: Plan and implement an independent research project in the system of the environmental risks management in the Arctic	GPC-7, PC-1, PC-4
LO8: Being able to communicate the own experiment and solutions to colleagues and laymen	GPC-3, GPC-4, GPC-5
LO9: Being able to cooperate in a multidisciplinary environment	KC-3, GPC-4, GPC-5, GPC-7, GPC-8, GPC-9
LO10: Having a proper understanding of social responsibilities related to the professional practice	KC-2, GPC-7, GPC-8, GPC-9