



CURRENT ISSUES OF MODERN ECOLOGY

The course is proposed for students in the academic year 2020-2021 as an optional one

Fall semester, 2020-2021

Coordinator	Iryna Shpakivska
Credits	4 ECTS (normative course), 60 in-class hours
Lecturers	Volodymyr Kyyak (Institute of Ecology of the Carpathians National Academy of Science of Ukraine, Ukraine) Iryna Shpakivska (Institute of Ecology of the Carpathians National Academy of Science of Ukraine, Ukraine) Oksana Maryskevych (Institute of Ecology of the Carpathians National Academy of Science of Ukraine, Ukraine) Andri-Taras Bashta (Institute of Ecology of the Carpathians National Academy of Science of Ukraine, Ukraine)
Level	PhD
Host institution	Institute of Ecology of the Carpathians National Academy of Science of Ukraine , Department of Ecosystemology, Department of Population Ecology
Course duration	November 1, 2020 – June 31, 2021

Summary

This 4 ECTS course is designed to provide applicants with the necessary knowledge on current environmental issues, current challenges of modern ecology, the main trends of man-made changes in environmental components, environmental policy of Ukraine and the EU, international agreements on environmental protection, index of the living planet, principles of ecological forecasting and modeling of the environment, methodological and theoretical foundations of environmental risks management, modern technologies in the field of remediation of environmental component.

Target student audiences

PhD students, study program Ecology, Natural Sciences (Code No. 101)

Prerequisites

Required courses (or equivalents):

- Philosophy of Science;
- Science Methodology

Aims and objectives

The aim of the course is to form a set of knowledge and competencies about current issues of modern ecology, the main trends of man-made changes in the environment, principles of ecological forecasting and modeling of the environment, basics of environmental risk management and forecasting, modern technologies in remediation and restoration of environmental components; mechanisms of ecological factors' influence on biota, features of



natural ecosystems' functioning and their adaptations to climate change

In addition, it introduces students to the EU environmental policy framework and institutions of environmental governance.

General learning outcomes:

By the end of the course, successful students will:

know:

- the basic facts of population, community and ecosystem level ecology the main current problems of modern ecology;
- the action of environmental factors at different levels of organization of living things;
- priority areas of research in the field of ecology and environmental protection;
- problems of sustainable nature management, conservation of biotic and landscape biodiversity;
- current state and trends of international cooperation in the field of environmental protection;
- environmental policy of Ukraine and the European Union

be able to:

- highlight the main environmental issues at the global, national, regional and local levels;
- to design an ecological study that addresses relevant questions, carry out the study using the appropriate equipment, and interpret and present your study to your peers
- clearly and concisely speak about and write about the major concepts in ecology.
- recognize the interconnections among the major concepts of ecology.
- understand how empirical evidence (i.e., data) supports or refutes the major concepts.
- investigate how the ecological concepts you learn in class relate to current environmental problems.
- to critically evaluate claims about ecological processes and data in the news
- apply the acquired knowledge during field research and examinations.

Overview of sessions and teaching methods

The course will make most of interactive and self-reflective methods of teaching and learning and, where possible, avoid standing lectures and presentations. The course combines interactive group and individual self-reflective methods of teaching and learning. The course includes in-class work (lectures, practical works and seminars) and independent work.

There are two sections

Section 1. Main environmental problems of today and ways to solve them

Topic 1. The place of fundamental ecology in the complex of environmental sciences.

Ecological imperative of the XXI century.

Topic 2. Priority areas of research in the field of ecology and environmental studies.

Topic 3. Anthropogenic transformation of the biosphere, modern environmental problems and ways to optimize them. Ecological crises in the history of mankind.

Topic 4. Index of a living planet, concept, evaluation and use in the planning of environmental research. Ecological footprint.



Topic 5. Problems of balanced nature management, conservation of biological and landscape diversity.

Topic 6. Gas composition of the atmosphere and its anthropogenic component, global climate change, decreasing ozone layer thickness, the role of biota in the biogeochemical cycle of Carbon and Nitrogen.

Topic 7. The role of forest ecosystems in maintaining the balance in the biosphere, forest degradation, opportunities for balanced forest use and preservation of ancient forests.

Topic 8. The state of water resources, the problem of aquatic ecosystems pollution in the oceans, the role of aquatic organisms in the functioning of aquatic ecosystems.

Topic 9. The pedosphere and its role in preserving habitat diversity, soil degradation and the need to preserve soil diversity on the planet.

Topic 10. Biodegradation and biodiversity loss, prospects for protection, conservation and reproduction of biodiversity at the species, population and ecosystem level.

Section 2. Environmental policy

Topic 1. Environmental services, classification, the need to assess and use to preserve the quality of the environment.

Topic 2. Environmental policy of Ukraine. Regulatory framework of Ukraine in the field of ecology and environmental protection.

Topic 3. International agreements on environmental protection, positive consequences of their observance and problems of implementation in Ukraine.

Topic 4. Environmental forecasting and risk assessment.

Topic 5. The main directions of the environment components remediation and rehabilitation of contaminated and water areas.

Topic 6. The current state and trends of international cooperation in the field of ecology and environmental protection, transboundary biosphere reserves and conservation of their biodiversity.

Topics of seminars

1. Ecological imperative of the XXI century
2. Modern environmental problems and ways to optimize them
3. Demography and Life History, Human population and Biosphere Recourses
4. Population growth: Ecological footprint, calculation of own ecological footprint
5. Ecological problems Terrestrial; Aquatic Coastal and Wetland Ecosystems
6. Ecological problems of mountains regions
7. Environmental services of protection areas of Carpathians countries
8. Biodegradation and biodiversity loss in Ukraine

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities			
Lectures	Understanding theories, concepts, methodology and tools	Class participation	36



Seminars	Understanding current challenges of modern ecology, the main trends of man-made changes in environmental components, environmental policy of Ukraine and the EU Understanding of key topics proposed for analysis and discussion	Class participation and preparedness for assignments	24
Independent work			
Individual assignments: - Development of presentations - Writing paper assignments	Ability to find related literature and data, to interpret data, to identify factors, to perform analysis and visualization of information	Quality of presentations and paper assignments	30
Reading and discussion of assigned papers for seminars and preparation for lectures, oral interviews and tests	Find related literature and data, interpret data, use the concepts, tools and methods covered in the course, and draw t relevant conclusions. Familiarity with and ability to critically and creatively discuss key concepts	Quality of developed ICT tools and their presentation. Class participation, creative and active contribution to discussion	30
<i>Total</i>			<i>120</i>

Grading

The following table defines the criteria for evaluating the student's work in studying the materials of the course. As a result, the student is able to get a maximum score of 100 points.

The minimum number of points required is 50 points.

In the course of studying the course a student receives points for performing various tasks.

Educational activity	Max	Min
In class disscuddaion during lectures	10	5
Seminar 1	5	2
Seminar 2	5	2
Seminar 3	5	2
Seminar 4	5	2
Seminar 5	5	3
Seminar 6	5	3
Seminar 7	5	3
Seminar8	5	3
Final control	50	25
Total	100	50

At the end of the course the student will have an exam.

Grading system is presented below



Score	Mark
90-100	Excellent
70-8-	Good
50-69	Satisfactory
1-49	No passed

Course schedule

Day	Time	Topic	Lecturer
October 2, Tuesday	15:05-16:25	Lecture 1. The place of fundamental ecology in the complex of environmental sciences. Ecological imperative of the XXI century.	Volodymyr Kyyak
	16:40-18:00	Lecture 2. Priority areas of research in the field of ecology and environmental studies.	
October 9, Tuesday	15:05-16:25	Seminar 1. Ecological imperative of the XXI century	Volodymyr Kyyak
	16:40-18:00		
October 19, Tuesday	15:05-16:25	Lecture 3. Anthropogenic transformation of the biosphere, modern environmental problems and ways to optimize them. Ecological crises in the history of mankind.	Iryna Shpakivska
	16:40-18:00	Seminar 2. Modern environmental problems and ways to optimize them	
October 29, Tuesday	15:05-16:25	Lecture 4. Index of a living planet, concept, evaluation and use in the planning of environmental research. Ecological footprint	Andri-Taras Bashta
	16:40-18:00		
November 06, Tuesday	15:05-16:25	Seminar 3. Demography and Life History, Human population and Biosphere Recourses	Iryna Shpakivska
	16:40-18:00		
November 13, Tuesday	15:05-16:25	Lecture 5. Problems of balanced nature management, conservation of biological and landscape diversity.	Iryna Shpakivska
	16:40-18:00	Seminar 4. Population growth: Ecological footprint, calculation of own ecological footprint	
November 20, Tuesday	15:05-16:25	Lecture 6. Gas composition of the atmosphere and its anthropogenic component, global climate change, decreasing ozone layer thickness, the role of biota in the biogeochemical cycle of Carbon and Nitrogen.	Iryna Shpakivska
	16:40-18:00		
November 27, Tuesday	15:05-16:25	Lecture 7. The role of forest ecosystems in	Oksana



	16:40-18:00	maintaining the balance in the biosphere, forest degradation, opportunities for balanced forest use and preservation of ancient forests. Lecture 8. The state of water resources, the problem of aquatic ecosystems pollution in the oceans, the role of aquatic organisms in the functioning of aquatic ecosystems.	Maryskevych Iryna Shpakivska
December 04, Tuesday	15:05-16:25 16:40-18:00	Seminar 5. Ecological problems Terrestrial; Aquatic Coastal and Wetland Ecosystems	Iryna Shpakivska
December 11, Tuesday	15:05-16:25 16:40-18:00	Lecture 9. The pedosphere and its role in preserving habitat diversity, soil degradation and the need to preserve soil diversity on the planet. Lecture 10. Biodegradation and biodiversity loss, prospects for protection, conservation and reproduction of biodiversity at the species, population and ecosystem level.	Iryna Shpakivska Volodymyr Kyyak
December 18, Tuesday	15:05-16:25 16:40-18:00	Lecture 11. Environmental services, classification, the need to assess and use to preserve the quality of the environment. Lecture 13. Environmental policy of Ukraine. Regulatory framework of Ukraine in the field of ecology and environmental protection.	Iryna Shpakivska Oksana Maryskevych
December 25, Tuesday	15:05-16:25 16:40-18:00	Seminar 6. Ecological problems of mountains regions Seminar 7. Environmental services of protection areas of Carpathians countries	Oksana Maryskevych Iryna Shpakivska
January 16, Tuesday	15:05-16:25 16:40-18:00	Lecture 14. Environmental forecasting and risk assessment. Lecture 15. The main directions of the environment components remediation and rehabilitation of contaminated and water areas.	Andri-Taras Bashta Oksana Maryskevych
January 23, Tuesday	15:05-16:25 16:40-18:00	Lecture 16. The current state and trends of international cooperation in the field of ecology and environmental protection, transboundary biosphere reserves and conservation of their biodiversity. Seminar 8. Biodegradation and biodiversity loss in Ukraine	Oksana Maryskevych Volodymyr Kyyak



Course assignments

The course includes the following practical works and seminars:

Topic	Number of hours
Seminar 1. Ecological imperative of the XXI century	4
Seminar 2. Modern environmental problems and ways to optimize them	2
Seminar 3. Demography and Life History, Human population and Biosphere Recourses	4
Seminar 4. Population growth: Ecological footprint, calculation of own ecological footprint	2
Seminar 5. Ecological problems Terrestrial; Aquatic Coastal and Wetland Ecosystems	4
Seminar 6. Ecological problems of mountains regions	2
Seminar 7. Environmental services of protection areas of Carpathians countries	2
Seminar 8. Biodegradation and biodiversity loss in Ukraine	2

Literature

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