FOREST ECOLOGY

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

**Spring semester, 2020-2021**

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| Cooordinator | **Iryna Shpakivska** |
| Credits | 2 ECTS (optional course), 30 in-class hours |
| Lecturers | **Iryna Shpakivska** (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 | February 1, 2021 – May 31, 2020 |

### Summary

*This 2 ECTS is designed to provide applicants with the necessary knowledge required for postgraduate students to develop a systematic analytical approach to assessing the nature of forests, the biosphere role of forest ecosystems, laws and principles of ecological construction of forest ecosystems, interaction of forest elements, the role of ancient and virgin forests in the biosphere, basics of sustainable forest management, principles of creation of nature reserve fund objects on forest lands, features of environmental impact assessment in forest use, principles and criteria of FSC-certification of forests.*

### Target student audiences

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

### Prerequisites

Required courses (or equivalents):

* Phylosophy of Science;
* Science Methodology;
* Current Issues of Modern Ecology
* Scientific principles of biodiversity conservation

### Aims and objectives

The aim of the course is to form a set of knowledge and competencies on the ability to analyze the condition of trees, forests, features of their growth and development based on the study of research data, literature and reference materials, the ability to plan and implement effective measures to organize the economy, increase plant productivity and their biological sustainability, preservation of biodiversity of forest ecosystems, preservation and reproduction of the functional essence of natural forests, measures for reconstruction and transformation of monodominant plantations, environmentally friendly use of forest resources, ability to form ecological thinking and consciousness of local population, education as to careful attitude to forest resources as unique value providing the living conditions of mankind, development of personal responsibility for the state of forest ecosystems at the local, regional, national and global levels

### General learning outcomes:

By the end of the course, successful students will:

**know:**

* main current problems of forest ecosystems at the local, regional and biosphere levels;
* the effect of environmental factors on forest ecosystems, mechanisms of their weakening and gaining resistance to climatic influences and pest infestations;
* priority areas of research in the field of forest ecology and creation of environmental facilities on forest lands;
* threats to the biodiversity of operational and protected forests;
* problems of balanced forest use, basics and principles of forestry close to nature;
* principles and criteria of FSC-certification of forests and features of their implementation in Ukraine
* current state and trends of international cooperation in the field of conservation and restoration of forest cover;
* theoretical bases of preservation, protection and restoration of ecological functions of forest ecosystems, their application in practice of forest use and nature protection;
* forest environmental policy of Ukraine and the European Union

**be able to:**

* highlight the main environmental problems of forest ecosystems at the global, national, regional and local levels;
* select the best methods of studying the structural and functional organization and ecological role of forest ecosystems;
* have a technique to monitor the state of forest ecosystems;
* apply appropriate methodological approaches, instrumental and laboratory methods to assess the status and forecast the dynamics of forest ecosystems;
* assess and model the state of forest ecosystems in different forest use scenarios;
* apply the acquired knowledge during the implementation of scientific research and economic expertise, to write innovative projects.

### 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. Peculiarity of forest ecosystems functioning

Topic 1. Fundamentals of forest ecology.

Topic 2. Forest as a component of the biosphere.

Topic 3. Ecology of the main forest-forming species and shrubs. Ecology of plants of the lower tier.

Topic 4. Phytoindication of anthropogenically disturbed forest ecosystems.

Topic 5. The impact of environmental factors on the forest.

Section 2. Scientific Principles of Forest Management

Topic 1. Ecological bases of classification and typology of forests of Ukraine.

Topic 2. Basic principles of sustainable forestry and close to nature forestry

Topic 3. Ancient and virgin forests

Topic 4. Dead wood and its role in forest ecosystems

Topic 5. Ecological and economic role of forest ecosystems

Topic 6. Forest policy of Ukraine and other states

Тopics of seminars

## Relationship and interaction between different species in forest ecosystems - forest autecology and synecology.

## Structural and functional organization of ancient and virgin forests in Ukrainian Carpathians and Polissya

## Structure and fractional composition of dead wood in natural forest ecosystems. Its role in the conservation of species and habitat biodiversity

## Ecosystem services of forest ecosystems in different Regions 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 | 22 |
| Seminars | Understanding current challenges of forest ecology, the main trends of man-made changes in forest components, forest policy of Ukraine and the EU  Understanding of key topics proposed for analysis and discussion | Class participation and preparedness for assignments | 8 |
| **Independent work** | | | |
| Іndividual 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 | 10 |
| 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 | 20 |
| ***Total*** |  |  | ***60*** |

### 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 | 30 | 16 |
| Seminar 1 | 5 | 2 |
| Seminar 2 | 5 | 2 |
| Seminar 3 | 5 | 2 |
| Seminar 4 | 5 | 2 |
| 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** |
| February 4, Tuesday | 16:40-18:00 | Lecture 1. Fundamentals of forest ecology | Iryna Shpakivska |
| February 11, Tuesday | 16:40-18:00 | Lecture 2. Forest as a component of the biosphere | Iryna Shpakivska |
| February 18, Tuesday | 16:40-18:00 | Lecture 3. Ecology of the main forest-forming species and shrubs. Ecology of plants of the lower tier. | Iryna Shpakivska |
| February 25, Tuesday | 15:05-16:25  16:40-18:00 | Seminar 1. Relationship and interaction between different species in forest ecosystems - forest autecology and synecology | Iryna Shpakivska |
| March 04, Tuesday | 16:40-18:00 | Lecture 4.Phytoindication of anthropogenically disturbed forest ecosystems | Iryna Shpakivska |
| March 12, Tuesday | 16:40-18:00 | Lecture 5. The impact of environmental factors on the forest | Iryna Shpakivska |
| March 19, Tuesday | 16:40-18:00 | Lecture 6. Ecological bases of classification and typology of forests of Ukraine | Iryna Shpakivska |
| March 26, Tuesday | 16:40-18:00 | Lecture 7. Basic principles of sustainable forestry and close to nature forestry | Iryna Shpakivska |
| April 01, Tuesday | 16:40-18:00 | Lecture 8. Ancient and virgin forests | Iryna Shpakivska |
| April 8, Tuesday | 16:40-18:00 | Seminar 2. Structural and functional organization of ancient and virgin forests in Ukrainian Carpathians and Polissya | Iryna Shpakivska |
| April 15, Tuesday | 16:40-18:00 | Lecture 9. Dead wood and its role in forest ecosystems. | Iryna Shpakivska |
| April 22, Tuesday | 16:40-18:00 | Seminar 3. Structure and fractional composition of dead wood in natural forest ecosystems. Its role in the conservation of species and habitat biodiversity | Iryna Shpakivska |
| April 29, Tuesday | 16:40-18:00 | Lecture 10. Ecological and economic role of forest ecosystems | Iryna Shpakivska |
| May 13, Tuesday | 16:40-18:00 | Seminar 4. Ecosystem services of forest ecosystems in different Regions in Ukraine | Iryna Shpakivska |
| May 20, Tuesday | 16:40-18:00 | Lecture 10. Forest policy of Ukraine and other states | Iryna Shpakivska |

### Course assignments

The course includes the following seminars:

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| --- | --- |
| **Topic Number of hours** | **Topic Number of hours** |
| Seminar 1. Relationship and interaction between different species in forest ecosystems - forest autecology and synecology | 2 |
| Seminar 2. Structural and functional organization of ancient and virgin forests in Ukrainian Carpathians and Polissya | 2 |
| Seminar 3. Structure and fractional composition of dead wood in natural forest ecosystems. Its role in the conservation of species and habitat biodiversity s | 2 |
| Seminar 4. Ecosystem services of forest ecosystems in different Regions in Ukraine | 2 |

### Literature

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