

**NATIONAL UNIVERSITY OF LIFE
AND ENVIRONMENTAL SCIENCES OF UKRAINE**

Department of forest mensuration and forest management

«CONFIRMED»

Director of the Education and Research Institute
of Forestry and Landscape-Park Management

R. Vasylyshyn

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«APPROVED»

at the meeting of the department of forest mensuration
and forest management

Protocol № 11 dated May 10, 2023

Acting Head of Department

V. Myroniuk

«REVIEWED»

Program coordinator

O. Bala

PROGRAM OF THE COURSE

Sustainable forestry

specialization _____ 205 – «Forestry»

Educational program _____ «Forestry»

Education and Research Institute of _____ Forestry and Landscape-Park Management

Developers: _____ Doctor of Agricultural Sciences, Professor Andrii Bilous

_____ Candidate of Agricultural Sciences, Associate Professor Ivan Lakysda

(position, academic degree, academic title)

Kyiv – 2023

1. Description of the course

Sustainable forestry

(title)

Field of knowledge, specialization, educational program, educational degree		
Educational degree	<i>Master</i>	
Specialization	<i>205 – Forestry</i>	
Educational program	<i>Forestry</i>	
Characteristics of the course		
Type	Elective	
Total number of hours	120	
Number of ECTS credits	4,0	
Number of content modules	2	
Course project (work) (if applicable)	<i>Exam</i>	
Indicators of the course for full-time and part-time forms of study		
	Full-time form of study	Part-time form of study
Course (year of study)	<i>2</i>	<i>2</i>
Semester	<i>1</i>	<i>1</i>
Lecture classes	<i>15 hr.</i>	<i>8 hr.</i>
Practical, seminar classes	<i>15 hr.</i>	<i>8 hr.</i>
Laboratory classes	–	–
Self-study	<i>90 hr.</i>	<i>104 hr.</i>
Individual assignments	–	
Number of weekly classroom hours for the full-time form of study	<i>2 hr.</i>	

2. Purpose, objectives, and competencies of the course

The aim of the discipline is to study the theoretical foundations of sustainable forestry development and master practical tools to ensure sustainable forest management.

The objectives of the course are:

- study the theoretical foundations and practical mechanisms for achieving sustainable development;
- analyze the relevance, content and strategic importance of the global sustainable development goals;
- mastering the content of Global Goal 15 "Life on Land";
- familiarization with global and regional trends in forestry development;
- study of environmental, economic and social prerequisites for sustainable forestry development;
- acquiring skills in the use of legislative, information, technological, economic and public tools to support sustainable forestry development and biodiversity conservation;
- development of strategic thinking and skills in managing sustainable forestry processes.

As a result of studying the discipline, the student should

know:

- environmental prerequisites, global and regional prerequisites for achieving sustainable development;
- methods and techniques for analyzing the process of achieving global sustainable development goals;
- the content of global goal 15 "Life on Land" and the role of forests and forestry in achieving it, in particular in Ukraine;
- global and regional trends in land use development, including forestry;
- environmental, economic and social prerequisites for the development of sustainable forestry;
- indicators and criteria for sustainable forestry development;
- legal, informational, technological and economic instruments for ensuring sustainable forestry development and biodiversity conservation.

be able to:

- apply the acquired knowledge in practice in solving specific problems related to the management of sustainable forestry development;
- use international methodologies, statistical databases, application solutions and information resources to monitor the state of forests, biodiversity and the current state of forestry on the path to sustainable development;
- analyze criteria and indicators of sustainable forestry;
- to assess the impact of various types of land use, information technology, biotechnology development, forest certification and public activities on sustainable development.

Acquisition of competencies:

integral competence (IC):

- the ability to solve complex tasks and problems in the field of forestry and hunting or in the process of learning, which involves research or innovation and is characterized by uncertainty of conditions and requirements.

general competencies (GC):

- ability to generate new ideas (creativity) (GC4);
- ability to work in an international context (GC7).

professional (special) competencies (PC):

- ability to ensure sustainable development of forestry (SC 2);
- ability to evaluate regional peculiarities of natural and climatic conditions for the organization of effective forestry, fulfillment of various functions by forests and increase of forest areas (SC3);
- ability to carry out educational activities among the population to form their environmental thinking, consciousness and responsibility for the environment (SC6).

Program learning outcomes:

- specialized conceptual knowledge that includes modern scientific achievements in the field of forestry and is the basis for original thinking, sustainable development and research (PLO1);
- communicate fluently orally and in writing in Ukrainian and foreign languages when discussing professional issues, research and innovation in the field of forestry (PLO2);
- to make effective decisions on forestry issues, including in difficult and unpredictable conditions; to predict its development; to identify factors that affect the achievement of goals; to analyze and compare alternatives; to assess risks and possible consequences of decisions (PLO3);
- manage complex activities in the field of forestry and in broader contexts, ensure

- quality, evaluate efficiency and effectiveness of activities (PLO5)
- to assess the state of forest phytocoenoses, forest resources in specific forest vegetation conditions, their potential and to predict the possibilities of use (PLO6);
 - to develop and implement scientific and applied projects in the field of forestry, taking into account available resources and risks, as well as economic, legal and environmental aspects (PLO7);
 - develop and improve technological and production processes, implement modern digital technologies (PLO8);
 - determine performance criteria and choose the optimal forestry strategy depending on external and internal conditions (PLO9);
 - clearly and unambiguously communicate their own knowledge, conclusions and arguments on forestry and related issues to specialists and non-specialists, including students (PLO 10);
 - to apply modern experimental and mathematical methods, digital technologies and specialized software to solve complex problems of forestry and hunting (PLO11).

3. Program and structure of the course

MODULE 1 SUSTAINABLE DEVELOPMENT

Lecture 1.

What is Sustainable Forestry?

Trends and directions of forestry development in the world, Europe and Ukraine. The state of forestry on different continents according to scientific sources and statistical reports of different countries for the period 2012-2021. General concepts, terminology and definitions of sustainable forestry. Trends in the development of forest management in Ukraine.

Lecture 2.

The Sustainable Development Goals

General trends and directions of global development, with a special focus on Europe and Ukraine. Prerequisites, theoretical foundations and problems of sustainable development. Relevance, goals and objectives for the global sustainable development goals. Determining the relationship of global sustainable development goals with forestry.

Lecture 3.

Goal 15: Life on land

The purpose and content of Goal 15 "Life on Land". Strategic principles, practical content and importance of achieving global sustainable development goal 15 "Life on Land". The role of forestry and forests on the way to achieving Goal 15 "Life on Land". The relationship between forestry and other land uses within the framework of the global sustainable development goals, in particular, Goal 15 "Life on Land".

MODULE 2 SUSTAINABLE FOREST MANAGEMENT

Lecture 4.

Criteria and indicators of sustainable forest management

Discussion review of criteria and indicators of sustainable forest management. Critical analysis of the balance of sustainable forest management on ecological, economic and socio-cultural grounds. Levels of use of criteria and indicators of sustainable forest management.

Lecture 5.

Criteria and indicators for the conservation and sustainable management of temperate and boreal forests

Discussion review of criteria and indicators for the conservation and sustainable management of temperate and boreal forests. Critical analysis of the content of the criteria and indicators. Comparison of the relevance of the criteria for the global level and forestry in Ukraine.

Lecture 6.

Conservation and sustainable use of forests and forest biodiversity

Problems of forest conservation at the global and regional levels. Sustainable use of forest resources. Status and tools for maintaining biodiversity. Prerequisites for the objectives of the Montreal process. Strategic goals for biodiversity conservation.

Names of content modules and topics	Number of hours													
	Full-time form							Part-time form						
	weeks	total	including					total	including					
			l	p	lab	ind	self		l	p	lab	ind	self	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
MODULE 1. SUSTAINABLE DEVELOPMENT														
Topic 1. What is Sustainable Forestry?	1	14	2	2			10	10						10
Topic 2. The Sustainable Development Goals	2	14	2	2			10	14	2	2				10
Topic 3. Goal 15: Life on land	3	14	2	2			10	14	2	2				10
Total for module 1	3	42	6	6			30	38	4	4				30
MODULE 2. SUSTAINABLE FOREST MANAGEMENT														
Topic 4. Criteria and indicators of sustainable forest management	4	16	2	2			12	19	2	2				15
Topic 5. Criteria and indicators for the conservation and sustainable management of temperate and boreal forests	5	32	4	4			24	34		2				30
Topic 6. Conservation and sustainable use of forests and forest biodiversity	6	30	3	3			24	31	2					29
Total for module 2	5	78	9	9			60	84	4	4				74
Total hours		120	15	15			90	120	8	8				104

4. Practical class topics

№	Topic title	Number of hours
1	Analysis of sustainable development goals	2
2	Challenges to implementation sustainable development goals	2
3	Goal 15: Life on land	2
4	Pan-European criteria and quantitative indicators for sustainable forest management	2
5	Using data from the global forest resources assessment	4
6	Using data from the Joint pan-European dataset	3
	Total	15

5. Self work topics

№	Topic title	Number of hours
1	Global Sustainability Beacons	30
2	Sustainable Forest Management Practices in Ukraine's Forestry	60
	Total	90

6. Control questions

1. What is Sustainable Development?
2. What is Sustainable Forestry?
3. What are the Sustainable Development Goals?
4. What is Goal 15: Life on land?
5. What are indicators of sustainable forest management?
6. What are the criteria for sustainable forest management?
7. What are indicators for the conservation of temperate forests?
8. What are the criteria for the conservation of temperate forests?
9. What are indicators for the conservation of boreal forests?
10. What are the criteria for the conservation of boreal forests?
11. What are indicators for sustainable management of temperate forests?
12. What are the criteria for sustainable management of temperate forests?
13. What are indicators for sustainable management of boreal forests?
14. What are the criteria for sustainable management of boreal forests?
15. What is the sustainable use of forests?
16. What is the sustainable use of forest biodiversity?
17. Which tools do you know to support sustainable forest management?
18. Which databases do you know to support sustainable forest management?
19. How does forest certification support sustainable forestry?
20. Why forest biotechnologies are essential for sustainable development?

7. Teaching methods

During the study of the discipline, verbal, visual and practical teaching methods are used. Part of the practical work is performed by higher education students on the basis of methods of analysis, observation, synthesis, chronological sequence on personal computers or a computer classroom of the Department of Forest mensuration and Forest Management.

8. Forms of assessment

The main form of control of mastering the discipline is an exam. Upon completion of the study of the educational material within each content module, knowledge control is carried out in the form of a test developed in the ESC on the basis of the Elearn system. The progress of individual tasks is systematically monitored by the teacher during classes.

9. Distribution of grades received by students

Student knowledge is assessed on a 100-point scale and converted into national grades according to Table 1 "Regulations on Exams and Tests at NULES of Ukraine" (approved by the Academic Council of NULES of Ukraine on 27.12.2019, Protocol No. 5; as amended on March 3, 2021, Protocol No. 7).

The following methodology is used to determine the rating of higher education applicants for academic work and discipline:

Current control		Academic performance rating (R_{HP})	Rating for additional work (R_{DP})	Penalty rating ($R_{ШТ}$)	Final certification (exam) (R_A)	Total amount of points ($R_{ДИС}$)
Module 1 (R_{M_1})	Module 2 (R_{M_2})					
0–100	0–100	0–70	0–20	0–5	0–30	0–100

$$R_{HP} = 0,7 \cdot \frac{R_{M_1} \cdot 3,0 + R_{M_2} \cdot 3,0}{6,0} + R_{DP} - R_{ШТ}$$

$$R_{ДИС} = R_{HP} + R_{AT}$$

CRITERIA FOR ASSESSING STUDENTS' KNOWLEDGE in the discipline «Sustainable forestry»

Type of activity	Amount of points	"Weight" of each module in the overall rating, %
ACADEMIC WORK		70
Module 1	100	35
P.A. 1. Analysis of sustainable development goals	15	
P.A. 2. Challenges to implementation sustainable development goals	15	
P.A. 3. Goal 15: Life on land	20	
S.A. 1. Global Sustainability Beacons	20	
Module test	30	
Module 2	100	35
P.A. 4. Pan-European criteria and quantitative indicators for sustainable forest management	15	
P.A. 5. Using data from the Global forest resources assessment	20	
P.A. 6. Using data from the Joint pan-European dataset	20	
S.A. 2. Sustainable Forest Management Practices in Ukraine's Forestry	15	
Module test	30	
Final certification (exam)		30
Total amount of points		100

Correlation between the rating of a higher education applicant and national grades

Student rating, points	National grade based on exam results	
	Exams	Credits
90-100	Excellent	Passed
74-89	Good	
60-73	Satisfactory	
0-59	Unsatisfactory	Not passed

9. Educational and methodological support

Elearn online study course at <https://elearn.nubip.edu.ua/course/view.php?id=4320>

10. Recommended sources of information

– main

1. Lindenmayer, D.B., Margules, C.R. and Botkin, D.B. (2000), Indicators of Biodiversity for Ecologically Sustainable Forest Management. Conservation Biology, 14: 941-950. <https://doi.org/10.1046/j.1523-1739.2000.98533.x>

2. Ewald Rametsteiner, Markku Simula, Forest certification—an instrument to promote sustainable forest management?, Journal of Environmental Management, Volume 67, Issue 1, 2003, Pages 87-98,

3. Lakyda P., Shvidenko A., Bilous A., Myroniuk V., Matsala M., Zibtsev S., Schepaschenko D., Holiaka D., Vasylyshyn R., Lakyda I., Diachuk P., Kraxner F. Impact of Disturbances on the Carbon Cycle of Forest Ecosystems in Ukrainian Polissya. Forests. 2019. 10 (4). 337. doi.org/10.3390/f10040337

4. Myroniuk, V.; Bilous, A.; Khan, Y.; Terentiev, A.; Kravets, P.; Kovalevskiy, S.; See, L. Tracking Rates of Forest Disturbance and Associated Carbon Loss in Areas of Illegal Amber Mining in Ukraine Using Landsat Time Series. Remote Sens. 2020, 12, 2235. <https://doi.org/10.3390/rs12142235>

5. Лісотаксаційний довідник (доповнене видання) / уклад. А.М. Білоус, С.М. Кашпор, В.В. Миронюк, В.А. Свинчук, О.М. Леснік. – Київ : Видавничий дім «Вінченко», 2021. 420 с.

– additional

6. Matsala M., Bilous A., Myroniuk V., Diachuk P., Burianchuk M. & Zadorozhniuk R. (2021) Natural forest regeneration in Chernobyl Exclusion Zone: predictive mapping and model diagnostics, Scandinavian Journal of Forest Research, DOI: 10.1080/02827581.2021.1890816

Internet-sources

1. The Sustainable Development Goals <https://www.un.org/sustainabledevelopment/sustainable-development-goals/> (дата звернення 01.06.2023 р.).

2. The Global Forest Resources Assessment : веб-сайт. URL: <https://fra-data.fao.org/> (дата звернення 01.06.2023 р.).

3. The Joint pan-European dataset : веб-сайт. URL: <https://fra-data.fao.org/WO/fra2020/home/> (дата звернення 01.06.2023 р.).

4. FAOSTAT : веб-сайт. URL: https://www.fao.org/faostat/en/?fbclid=IwAR1gJvWISDv6y75RSpdn2fWK5vTKD9etO2JVOrC0YKtcUqU4RFIFa_a_xss#data (дата звернення 01.06.2023 р.).

5. Restor : веб-сайт. URL: <https://restor.eco/> (дата звернення 01.06.2023 р.).

6. Закон України «Про оцінку впливу на довкілля» : веб-сайт. URL: <https://zakon.rada.gov.ua/laws/show/2059-19#Text> (дата звернення 01.06.2023 р.).

7. Екозагроза: : веб-сайт. URL: <https://ecozagroza.gov.ua/> (дата звернення 01.06.2023 р.).