COURSE DESCRIPTION

The field of ecosystem services represents an important new organizational framework for the conservation and management of natural resources, which is used in various places around the world. Ecosystem services are the conditions and processes by which natural and managed ecosystems and their constituent species support and fulfill human life. These services range from providing food and clean drinking water to regulating the climate and mitigating the effects of floods to recreational activities and spiritual fulfillment, and more. Although these services are inherent in our lives, most of them have historically been underestimated in land use, economic and political decisions. As a last resort, the value of ecosystem services is recognized only after their loss. In this course, we will look at related environmental, economic, and institutional challenges to better characterize the contribution of ecosystem services to human well-being and to develop methodologies and institutions for integrating ecosystem services into decision-making. We will critically examine how these approaches are being improved through research and practice through new efforts in the academic, public, private and non-profit sectors.

As a result of taking the course "Forest ecosystem services" an applicant for higher education shall:

– know categories and concepts of biophysical and economic assessment of functions and services of forest ecosystems; directions and approaches to certification of forest ecosystem services; best available information on the assessment of forest ecosystem services in Ukraine and abroad
– be able to apply the acquired knowledge and computer technology during calculations; be able to carry out biophysical assessment and economic valuation of the most important services of forest ecosystems, be able to substantiate separate decisions concerning importance of ecosystem services under given conditions, to be able to compare economic indicators for various services of forest ecosystems.

Competencies of the educational program:

Integrative competency (IC):
– ability to resolve complex tasks in forestry or during study process that require investigations or innovations.

General competencies (GC):
– ability to work in an international context (GC7).

Professional (special) competencies (SC):
– ability to ensure sustainable development of forestry (SC 2);

– ability to develop and implement current and strategic plans for the development of forestry enterprises, taking into account resources, risks, as well as economic, legal and environmental aspects (SC4);

– ability to carry out educational activities among the population to form their environmental thinking, consciousness and responsibility for the environment (SC6).

Program learning outcomes (PLO):
– communicate fluently orally and in writing in Ukrainian and foreign languages when discussing professional issues, research and innovation in the field of forestry (PLO 2);

– 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 (PLO 3);

– manage complex activities in the field of forestry and in broader contexts, ensure quality, evaluate efficiency and effectiveness of activities (PLO 5)

– assess the state of forest phytocoenoses, forest resources in specific forest vegetation conditions, their potential and to predict the possibilities of use (PLO 6);

– 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 (PLO 7);

– develop and improve technological and production processes, implement modern digital technologies (PLO 8);

– determine performance criteria and choose the optimal forestry strategy depending on external and internal conditions (PLO 9);

– clearly and unambiguously communicate their own knowledge, conclusions and arguments on forestry and related issues to specialists and non-specialists, including students (PLO 10);

– apply modern experimental and mathematical methods, digital technologies and specialized software to solve complex problems of forestry and hunting (PLO11).

COURSE STRUCTURE

Topic	Hours (lectures/practicals /independent)	Learning outcomes	Assignments	Grading
Module 1: Classification and biophysical assessment of ecosystem services				
Topic 1 Introduction to Ecosystem Services	2/2/8	To know definition of ecosystem services. To be able to classify ecosystem services. To be competent about the Common International Classification of Ecosystem Services.	Submission of practical assignment Submission of independent assignments	10 2
Topic 2 Ecosystem services: Provisioning (biotic and abiotic)	2/2/8	To know and be able to differentiate the differences between the following divisions: biomass, genetic material from all biota, and other types of provisioning services; water provisioning, and non-aqueous natural abiotic ecosystem outputs. To be able to assess biophysical parameters of forest biomass, and of energy accumulated in forest biomass.	Submission of practical assignment Submission of independent assignments	15 2
Topic 3 Forest ecosystem services: Regulation & Maintenance	2/2/8	To know the concepts of biotic and abiotic forest ecosystem services of regulation and maintenance. To be able to carry out studies on provisioning of ecosystem services.	Submission of practical assignment Submission of independent assignments	15 2
Topic 4 Forest ecosystem services: Cultural	2/2/8	To know the concepts of biotic and abiotic cultural forest ecosystem services. To be able to assess biodiversity in forest ecosystems in biophysical terms.	Submission of practical assignment Submission of independent assignments	10 2

Topic	Hours (lectures/practicals /independent)	Learning outcomes	Assignments	Grading
Topic 5 Ecosystem Services and Biodiversity	2/2/8	To know the role of biodiversity in ecosystem services. To be competent about mapping and assessing ecosystem services. To know the importance of valuation of ecosystem services and systems thinking.	Submission of practical assignment Submission of independent assignments	10 2
Module test				30
Module 1 Total				100
Module 2: Economic valuation of ecosystem services				
Topic 6 Forest ecosystem services and types of values	2/2/8	To know the general concepts of economic valuation of goods and services. To be able to classify values, link ecosystem services with types of values.	Submission of practical assignment Submission of independent assignments	10 2
Topic 7 Basics of economic valuation of ecosystem services	2/2/8	To know the concepts of public and private goods, and differences between them. To be able to delineate the different methods of economic valuation of ecosystem services. To be able to apply benefit transfer studies, differentiate between study and policy cases.	Submission of practical assignment Submission of independent assignments	10 2
Topic 8 Overview of direct methods of economic valuation of ecosystem services	2/2/8	To know the concepts of direct methods of economic valuation of ecosystem services. To be able to characterize and differentiate the methods of Contingent valuation, Travel cost, and Hedonic pricing. To be able to	Submission of practical assignment Submission of independent assignments	15 2

Topic	Hours (lectures/practicals /independent)	Learning outcomes	Assignments	Grading
		carry out economic valuation of carbon sequestrative service of forest ecosystems.		
Topic 9 Overview of indirect methods of economic valuation of ecosystem services	2/2/8	To know the concepts of indirect methods of economic valuation of ecosystem services. To be able to carry out economic valuation of oxygen productive service of forest ecosystems.	Submission of practical assignment Submission of independent assignments	15 2
Topic 10 Certification for ecosystem services	2/2/8	To know the concepts of Forest management and Chain-of-Custody certification. To know and be able to justify the reasons for certification. To be able to use the FSC Ecosystem Service verification tools and procedures, identify communication activities related to ecosystem services certification claims.	Submission of practical assignment Submission of independent assignments	10 2
Module test				30
Module 2 Total				100
Training activity Total				70
Exam				30
Course Total				100

GRADING POLICY

Deadline and Remedial Policy:	Deadlines are set for all the assignments. Practical works submitted in violation of deadlines without a good reason will be penalized by lower grade. Re-takes of module tests in presence of good reasons (e.g.: sick leave) take place on lecturer's permission.
Academic Integrity Policy:	Cheating during tests and examinations is strictly forbidden (including using mobile phones and tablets). All written works are checked for plagiarism and are allowed to be defended when the total share of properly referenced text is up to 20%.
Attendance Policy:	Attendance is mandatory. For objective reasons (e.g.: sick leave, international internship) teaching can take place individually (online, under a warrant from the Institute's Director).

KNOWLEDGE GRADING SCALE

Rating of the applicant of higher education, points	Evaluation results on national exams, tests	
	exam	test
90-100	excellent	passed
74-89	good	
60-73	satisfactory	
0-59	unsatisfactory	not passed

RECOMMENDED INFORMATION SOURCES

Main information sources:
1. Grunewald, K., & Bastian, O. (Eds.). (2015). Ecosystem Services – Concept, Methods and Case Studies
2. The Common International Classification of Ecosystem Services (CICES)
3. The Common International Classification of Ecosystem Services (CICES) ver. 5.1
4. Guidance on the Application of the Revised Structure (CICES) V 5.1
5. Summary on Economic Valuation of Ecosystem Services
6. CIFOR Ecosystem Services Certification: Opportunities and Constraints
7. FSC Ecosystem Services Procedure: Impact Demonstration and Market Tools

Additional information sources:
1. Heinrich Boell Stiftung - The Green Political Foundation
2. INCA Platform
3. UN System of Environmental Economic Accounting
4. The Economics of Ecosystems and Biodiversity: Home

Reference books:
1. Handbook: Tables for ecosystem services assessment of soft-leaved forests of Ukrainian Polissya
2. Monograph: Ecosystem Services of Ukrainian Forests: a Case Study of the Polissya Region