



▼ Vispārēji

[Savērst visu](#)



Course Description

This course is part of the Ministry of Foreign Affairs of Latvia-funded project *"Biotechnology and Digital Skills Improvement in Climate-Controlled Agriculture (BioDigiSkills)"*, implemented in collaboration between Latvia, Uzbekistan, and Ukraine. It combines biotechnology, agroecology, and digital competencies, focusing on in vitro plant propagation and sustainable crop management.

Participants are encouraged to complete short knowledge tests after each module to strengthen understanding and obtain a certificate of participation.



[Announcements](#) ○



[1_Introduction of BioDigiSkills in University Study Programs](#) ○

▼ BioDigiSkills Certificates



[BioDigiSkills Certificates](#)

▼ Ukraine (Izcelts)



▼ Topic1 Agroecology: Basics and Practices



This topic introduces **agroecology** as a comprehensive science that combines ecological and social principles to create sustainable agricultural systems. You will learn about the history and key principles of agroecology, as well as its goals of ensuring food security, protecting the environment, and improving soil fertility.

Throughout the course, you will study the concept of **agroecosystems**—artificial ecosystems created by humans—and their role in modern agricultural production. We'll explore how agroecology helps preserve biodiversity, promotes natural pest control, facilitates nutrient cycling, and provides other vital ecosystem services.

Furthermore, the course covers modern research areas like **agroforestry**, the use of biostimulants, the cultivation of energy crops, and soil restoration after conflicts. You will also get acquainted with the practical application of agroecological approaches in various countries around the world.



[Information about the expert Oksana Tonkha](#)



[2. Scientific bases of agroecology. Purpose and tasks](#) (PPTX)



[3. Structure and functions Agroecosystems. Nature-friendly agricultural practices](#) (PPTX)



[Quiz 1. Agroecology: Basics and Practices](#)

Please take the Quiz

✓ Topic 2. Berry Crops: Cultivation and Nutrition



Protected Cultivation of Small Fruit Crops

Climate change and weather risks in the sustainable production of small fruit crops are becoming increasingly serious **challenges** for both modern farmers and professional growers. The production of small fruit crops (**strawberries, raspberries, and blueberries**) under **protected cultivation** is a crucial step in ensuring a plentiful and safe supply of fresh produce.

Within this course, the **benefits and drawbacks** of some of these methods will be discussed, along with the necessary **equipment and materials** required for success in each system. Additionally, a variety of **challenges** associated with protected cultivation will be covered, including **disease management, pest control, and water management**. Finally, the discussion will address the **potential for increased efficiency and yields** through protected cultivation, as well as the **economic and environmental benefits** of this production system.



[Information about the expert Yana Tereshchenko](#) ○



[4. Plant growth and development. Phytohormones](#) ○

This topic explains the physiological basis of plant growth and development, emphasizing the role of light, temperature, moisture, and nutrients under controlled conditions. Students learn about key phytohormones—auxins, gibberellins, cytokinins, abscisic acid, and ethylene—and how they regulate cell division, elongation, flowering, and stress responses in horticultural crops.



[Quiz 1. Plant growth and development. Phytohormones](#)

Please take the Quiz 1.



[5. Tabletop strawberry growing system](#) ○

Strawberry (*Fragaria x ananassa* Duch.) is a plant cultivated all over the world. It is even considered the most widely cultivated crop, spanning almost all continents.

Strawberries are valued for their **biochemical composition, taste, and flavor, bright red color, juicy texture**, and they are one of the most popular summer fruits in European countries. Thanks to the **tabletop growing system**, strawberries are available in grocery stores **365 days a year**.

This lecture describes the main aspects of strawberry cultivation, such as **construction, media, gutter structure, pest control, and suitable cultivars**.

47.0 MB



[Quiz 2. Tabletop strawberry growing system](#)

Please take the Quiz 2.



[6. Raspberry growing systems for Tunnels and Greenhouses](#) ○

Raspberry fruits are valued for their taste and aroma, as well as for their ability to provide early/late production, which is well-utilized in the markets. A significant portion of the world's raspberry supply is now produced in simple controlled-environment structures, such as high tunnels.

This lecture covers the main aspects of raspberry cultivation, including planting distance, growing methods, pruning and trellising (or support systems), as well as plant protection.

Please take the Quiz 3.



[7. Economy and technology of blueberry](#) ○

Blueberry is becoming an increasingly popular crop among small fruits, successfully grown both in the open field and in **high tunnels**. High tunnel production provides **early ripening**, **high quality of fruits**, and other benefits.

This lecture describes aspects such as the **selection of pots, substrate, pruning, irrigation and fertigation**, and presents the **best cultivars** for growing.



[Quiz 4. Economy and Technology of Blueberry Cultivation in Greenhouses](#)

Please take the Quiz 4.



[8. Nutritional management of berry crops](#) ○

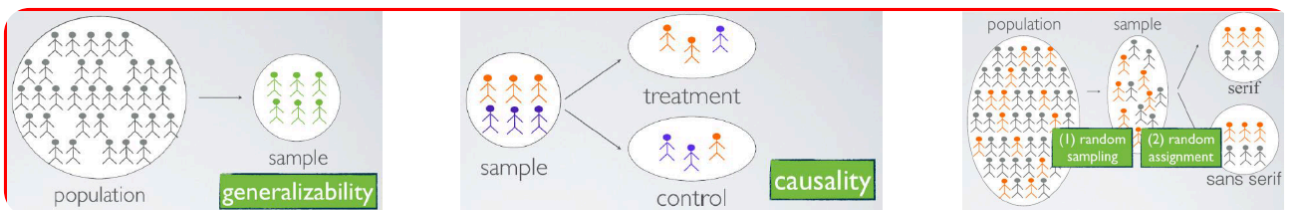
The main principles of providing a plant's nutrition system; micro, mezzo, and macro elements—their role in development and growth; the effect of nutrient deficiency and the main factors which impact different processes in plant organisms—are the questions for this lecture.



[Quiz 5. Nutritional management of berry crops](#)

Please take the Quiz 5.

✓ Topic3_Python for Data Analysis in Agriculture



This topic provides an introduction to data analysis using Python, guiding learners through the end-to-end process of transforming raw data into actionable insights and focusing on practical skills and widely used libraries.

Students will first master essential data exploration, cleaning, and visualization techniques with Python libraries like Pandas and Matplotlib, laying a solid foundation for further analytical work. The curriculum then delves into statistical and machine learning methods for understanding relationships within data, covering correlation, regression, and time series analysis. Finally, the topic explores various machine learning classification algorithms.

Through hands-on exercises and real-world datasets, learners will develop the ability to extract meaningful insights and build predictive models.

✓ Exploratory Data Analysis, Cleaning and Visualization with Python



[Information about the expert Volodymyr Kravchenko](#) ○



[10_Section 1.2 Exploratory Data Analysis \(EDA\) and Data Visualization](#)



[Quiz 6. EDA](#)

Atvērts: trešdiena, 2025. gada 8. oktobris, 09:51



Topic 2 Correlation and Regression Analysis with Python: Statistical and Machine Learning Methods



[11_Section 2.1 Bivariate Analysis and Linear Regression](#)



[12_Section 2.2 Time Series Analysis with Python](#)



[Quiz 7. Regression](#)

Atvērts: trešdiena, 2025. gada 8. oktobris, 10:23



Topic 3 Classification with Python



[13_Section 3.1 Basics of Classification: KNN, SVM, and Decision Trees](#)



[14_Section 3.2 Machine Learning Algorithms in Binary and Multi-Class Classification](#)



Uzbekistan



Smart agricultural

This course introduces modern concepts and technologies in smart agriculture, focusing on the integration of digital tools, automation, and precision farming methods. Students will explore the use of sensors, drones, IoT systems, and data analytics to optimize crop production, resource efficiency, and environmental sustainability. The course provides both theoretical knowledge



[15. Smart agricultural](#) ○

This topic introduces data-driven and automated technologies for modern horticulture, focusing on controlled-environment systems, precision irrigation, IoT-based monitoring, and smart livestock management. Students learn how digital tools and sensors optimize crop growth, resource use, and sustainability in agriculture.



[Quiz 8: Smart agriculture](#)

Please take the Quiz



[16. Policies toward Sustainable Agriculture, Food Production and Bioeconomy development in Uzbekistan](#) ○

This topic presents Uzbekistan's strategic shift toward a sustainable and bio-based economy, addressing challenges of climate change, water scarcity, and agricultural modernization. It highlights national policies promoting efficient resource use, renewable energy, and circular bioeconomy principles to enhance food security, environmental resilience, and green economic growth.

✓ [In Vitro Plant Biotechnology for Sustainable Cultivation](#)



Focus on in vitro propagation of potato, strawberry, sweet potato, and selected medicinal plants. Students learn about sterilization and culture protocols, multiplication and rooting techniques, and acclimatization practices to ensure pathogen-free, high-quality planting material for sustainable production.



[17. Prospects for growing medicinal plants in vitro. PhD Tashpulatov Y.](#) ○

This topic provides an overview of medicinal plants, their traditional and modern uses, and their role in human health. Students learn about major groups of bioactive compounds, conservation of plant resources, and the importance of medicinal plants in pharmacology, biotechnology, and sustainable agriculture.



[Quiz 9. Prospects for growing medicinal plants in vitro](#)

Please take the Quiz



[18. Microclonal Propagation of Helichrysum maracandicum Popov ex Kirp.](#) ○

The presentation presents the results of a multi-year study on the in vitro cultivation of the rare medicinal plant *Helichrysum maracandicum* Popov ex Kirp. Protocols for cultivating the plant at various stages in vitro were developed. Furthermore, the plant's growth and development were studied ex vitro. The biomass of the plant material was determined, and its chemical composition was analyzed.



This topic covers the complete process of potato propagation under sterile laboratory conditions, from explant sterilization and nutrient medium preparation to acclimatization in greenhouse environments.



[20. In Vitro Potato Propagation and Microtuber Induction](#) ○

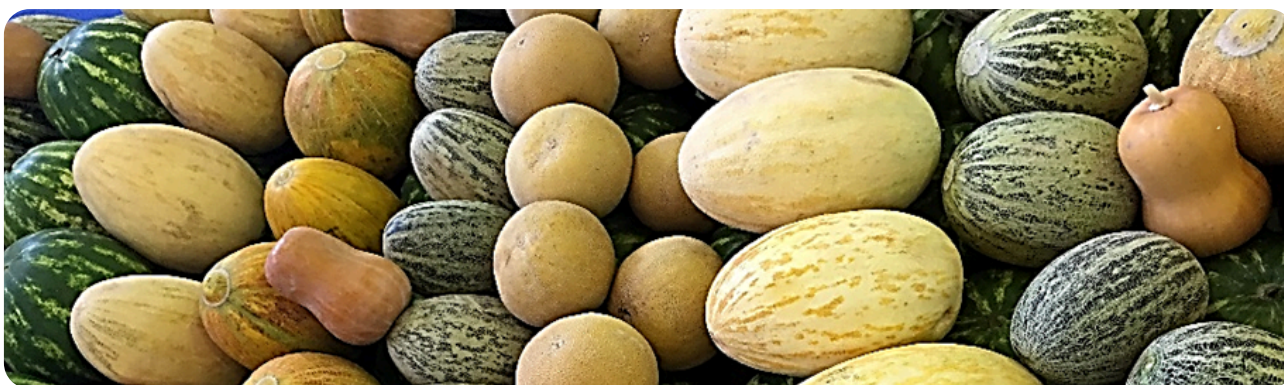
This seminar presentation discusses in vitro techniques for potato propagation, with a focus on microtuber induction and their application in seed potato production.



[21. Acclimatization of Fruit Trees in Protected Areas](#) ○

Acclimatization of fruit trees in protected areas and their adaptation strategies.

✓ [Fruit and Vegetable Crop Production Technologies](#)



This topic provides an overview of modern and traditional cultivation technologies for horticultural crops grown in Uzbekistan. It highlights sustainable practices, crop diversity, and innovative approaches developed through international collaboration to improve productivity, food quality, and environmental resilience.



[22. Guide on the cultivation technology of strawberry in Uzbekistan.](#) ○

This topic presents the biological characteristics and cultivation practices of strawberry under Uzbekistan's climatic conditions. It explains variety selection, soil preparation, planting, irrigation, fertilization, and pest and disease control, including modern methods such as film-covered cultivation. The material emphasizes sustainable production, high yield management, and the nutritional and medicinal importance of strawberries.



[Quiz 11. Guide on the cultivation technology of strawberry in Uzbekistan.](#)

Please take the Quiz



[23. The Melon Cultivation Technology in Uzbekistan](#) ○

This topic introduces the centuries-old tradition and modern agrotechnology of melon (*Cucumis melo* L.) cultivation in Uzbekistan. It covers variety selection, seed preparation, greenhouse and open-field growing methods, fertilization, irrigation, and pest management.

Please take the Quiz



[24. Cultivation Technology of Sweet Potato \(Ipomoea batatas L.\) in Uzbekistan](#)

This topic presents the nutritional value, morphology, and cultivation practices of sweet potato under Uzbekistan's climatic conditions. It covers traditional and in vitro seedling production, optimal soil and temperature requirements, fertilization, irrigation, harvesting, and storage methods, emphasizing sustainable production and food security potential of this valuable crop.



[Quiz 13. Cultivation Technology of Sweet Potato](#)

Please take the Quiz



[25. The Cultivation Technology Of Okra In Uzbekistan](#)

This topic introduces the biological, nutritional, and economic importance of okra as a valuable vegetable and industrial crop. It explains optimal growing conditions, soil and climate requirements, fertilization, irrigation, pest and disease management, and harvesting techniques.

Noderīgas saites

- ▶ IT atbalsta dienests
- ▶ Informācija par IT atbalsta sistēmas lietošanu
- ▶ IT atbalsta e-pasts servisapasts@lu.lv lietotājiem, kam nav LU konta



Palīdzība un dokumentācija

Jūs esat pieslēdzies kā Anta Sparinska (Atslēgties)

Iegūt mobilo lietotni