CURRICULUM
URBAN FARMING

COURSE DESCRIPTION

In this introduction course, students will learn what exactly is urban farming along with essential definitions and concepts that will help them get started on this exciting journey. Throughout this course, they will explore some of the literature in the field of urban agriculture, investigate and learn about the basic requirements on how to establish an urban farm. By the end, students will have a good understanding of urban agriculture.

In addition to learning how to grow fruits and vegetables, students will learn about the nutritional aspects, storage requirements and utilization of crops. Topics including urban livestock, aquaculture, rooftop gardening, hobby greenhouse production, and environment modification will also be discussed. Students will learn how the urban food production movement has influenced urban design and utilization of land within urban settings. Environmentally friendly practices including water harvesting, composting, organic production, and integrated pest management will be discussed. The curriculum targets everyone who wants to start an urban farm, suitable for adults, but also the younger generation with no experience in agriculture.

As a part of the course various formats will be utilized: lectures, presentations, workshops, open discussions, group work and case studies.

COURSE GOALS

The objectives of the course are:

- To provide specialized, profiled training in the field of urban farming, corresponding to the modern level of knowledge and practices.

- To provide basic knowledge and understanding about the benefits of urban farming
- To provide basic knowledge about organization, management and marketing strategies in urban farming
- To provide knowledge on the importance and purpose of plant protection in urban production and the key factors for successful sustainable management.
- To provide knowledge on production conditions and techniques of arable crops, vegetables and perennial crops.
- To provide knowledge and understanding of soil management: contamination, fertility, cultivation and fertilization; composting; crop rotation; Basic information on growing vegetables
- To provide knowledge about the different types of urban farming production systems

Trainees who complete this course successfully will be able to:

- start an urban farm;
- apply the principles of planning and management of production;
- communicate effectively on matters related to urban agriculture;
- utilize and sustain the natural resources for urban agriculture production.

ENTRY REQUIREMENTS

The participant must have completed a minimum of secondary education and be over 18 years old.

Participants in the program can be individuals interested in agricultural production (with or without experience) and do not need to have any prior knowledge, skills and competencies in this area.

Potential participants in the program are:

- citizens in urban areas interested in starting an urban farm

- individual agricultural producers;

- members of eco civic organizations;

- employees in agricultural holdings;

- agricultural technicians;

TEACHING STAFF

Trainers' qualifications (To be filled by the trainer)

OVERALL LEARNING OUTCOMES

Category	Results	Assessment methodology
Knowledge and understanding	Students will be able to understand the concept, theory, and basic principles of urban farming; Students will be provided with extensive knowledge in the field of urban farming. Students will understand the foundational principles of urban farming. They will learn about site selection, soil quality, and the various types of urban farming practices available, including container gardening, vertical farming, hydroponics, and more; Students will learn about Plant Selection and Care, and how to nurture crops. The teacher will guide students in choosing the best plants for your space, be it vegetables, herbs, or small fruits. Students will also learn the essential techniques for planting, maintenance, and pest control to ensure a bountiful harvest; Students will gain skills and knowledge about Sustainability; Students will learn about the possibilities with urban farming: We will explore the world of urban livestock and beekeeping, discussing the benefits and considerations of raising chickens, bees, and other small livestock; Students will learn how to foster community engagement and how to build a vibrant and supportive community around your urban farm is vital for its success; Students will learn how to overcome challenges: We provide practical solutions on how to keep the urban	1. Test 2. Class activity 3. Research projects and analysis 4. Participation in debates 5. Practical work

	farm flourishing. From identifying and managing pests and diseases to addressing weather - related problems, etc; Students will gain knowledge about different types of production systems (Horizontal/Vertical Farming, Urban Livestock and Beekeeping) Students will discover possibilities Beyond Your Urban Farming: exploring local food movements, farmers' markets, and the role of urban agriculture in building a more sustainable and resilient urban future.	

DAILY OR WEEKLY WORK/HOMEWORK

Depending on the assignment, it can be performed by a single student or a group.

- Students will be asked to prepare short verbal or power point presentation (PPT) on benefits of urban farming (social, economic, health...)
- Students will be asked to prepare short verbal or power point presentation of one of the steps within the planning process for starting an urban farm.
- Students will be asked to prepare short verbal or power point presentation of the elements of the marketing plan.
- Students will be asked to prepare short verbal or power point presentation on the physical, human resources and soil
- Students will be asked to prepare short verbal or power point presentation on the composting and compost.
- Students will be asked to prepare short verbal or power point presentation on the crop rotation
- Students will be asked to prepare short verbal or power point presentation about collecting and saving seeds.
- Students will be asked to prepare short verbal or power point presentation on measures to control weeds, diseases and harmful organisms.
- Students will be asked to prepare short verbal or power point presentation on the necessary techniques for the formation and maintenance of an urban garden in urban agriculture
- Students will be asked to prepare short verbal or power point presentation on the methods for horizontaly growing crops in urban farming

- Students will be asked to prepare short verbal or power point presentation on the methods for verticaly growing crops in urban farming.
- Students will be asked to prepare short verbal or power point presentation on the methods for urban livestock and beekeeping
- Students will be asked to prepare short verbal or power point presentation on the methods for urban mushroom production
- Students will be asked to prepare short verbal or PPT on methods and possible solutions on direct plant protection and direct measures for control of diseases, pests and weeds.
- Students will be asked to prepare short verbal or PPT on the production conditions and techniques for certain arable crops, certain vegetables and certain perennial crops.
- Students will be asked to give a short verbal or PPT on the traceability practice of a chosen product.
- Students will be asked to prepare short verbal or PPT on the characteristics of soil and soil organic matter.
- Students will be asked to prepare short verbal or PPT on the soil management, cultivation and analysis.
- Students will be asked to prepare short verbal or PPT on the crop rotation, green manures, catch crops and cover crops.

REQUIRED TEXTS, MATERIALS, OR EQUIPMENT

1. FALK, BRIAN & DUANY, ANDRÉS. (2020). TRANSECT URBANISM: READINGS IN HUMAN ECOLOGY.
2. Narvaez, Laura. (2016). Morphology, Design and Spatial Configurations: An evidence-based analysis of the economics in urban design.
3. Natrajan, Sriram. (2021). Urban Agriculture, Food Security and Sustainable Urban Food Systems in China.
4. Reeve, Jennifer & Carpenter-Boggs, Lynne & Sehmsdorf, Henning. (2011). Sustainable Agriculture: A Case Study of a Small Lopez Island Farm. Agricultural Systems. 104. 572-579. 10.1016/j.agsy.2011.04.006.
5. FAO, Rikolto and RUAF. (2022). Urban and peri-urban agriculture sourcebook – From production to food systems. Rome, FAO and Rikolto.
6. Anna Margrethe Andersen, Erik Enebaer, Marin Kanajet, Ana Mikačić, Ivan Rako, VedranaVučenović, Zoran Vukšić. (2023). Introduction to Urban Permaculture – An Initial VET Course.
7. Neith Little, Kim Rush Lynch, Dale Johnson, Nicole Cook, Ginger Myers. (2019). From Surviving to Thriving: Strategies for Urban Farmer Success
8. Hume, C., Grieger, J.A., Kalamkarian, A. *et al.* (2022). Community gardens and their effects on diet, health, psychosocial and community outcomes: a systematic review. *BMC Public Health* **22**, 1247
9. Kingsley, Jonathan & Townsend, Mardie. (2006). 'Dig In' to Social Capital: Community Gardens as Mechanisms for Growing Urban Social Connectedness. Urban Policy and Research. 24. 525 537.10.1080/08111140601035200.
10. Caldas, L.C. and Christopoulos, T.P. (2023), Social capital in urban agriculture initiatives, *Revista de Gestão*, Vol. 30 No. 1, pp. 92-105.

11. Türker, Hüseyin & Gul, Atila & anaç, ilayda. (2022). The role of urban agriculture in adapting to climate change for sustainable cities.
12. Diedrich, Lisa & Lee, Gini & Braae, Ellen. (2015). The Transect as a Method for Mapping and Narrating Water Landscapes: Humboldt's Open Works and Transareal Travelling.
13. Tornaghi, Chiara. (2016). Urban Agriculture in the Food-Disabling City: (Re)defining Urban Food Justice, Reimagining a Politics of Empowerment. Antipode. 49. 10.1111/anti.12291.
14. Daniels, Benjamin & Jedamski, Jana & Ottermanns, Richard & Roß-Nickoll, M.. (2020). A "plan bee" for cities: Pollinator diversity and plant-pollinator interactions in urban green spaces. PLOS ONE. 15. e0235492. 10.1371/journal.pone.0235492.
15. Theresa Nogeire-McRae, Elizabeth P Ryan, Becca B R Jablonski, Michael Carolan, H S Arathi, Cynthia S Brown, Hairik Honarchian Saki, Starin McKeen, Erin Lapansky, Meagan E Schipanski, The Role of Urban Agriculture in a Secure, Healthy, and Sustainable Food System, *BioScience*, Volume 68, Issue 10, October 2018, Pages 748–759,
17. Yücedağ, Cengiz & Çiçek, Nuray & Gul, Atila. (2023). The Role of Urban Agriculture in Cultivating the Adaptation to Climate Change and Sustainability in the Cities.
18. Lee-Smith, Diana & Prain, Gordon. (2006). Urban agriculture and health: understanding the links between agriculture and health. International Food Policy Research Institute (IFPRI), 2020 vision briefs.
19. Herbert E. Ainamani, Nolbert Gumisiriza, Wilson M. Bamwerinde, Godfrey Z. Rukundo, (2022). Gardening activity and its relationship to mental health: Understudied and untapped in low-and middle-income countries, Preventive Medicine Reports, Volume 29, 101946, ISSN 2211-3355
20. Malberg Dyg, Pernille & Christensen, Søren & Peterson, Corissa. (2019). Community gardens and wellbeing amongst vulnerable populations:
21. Neith Little, Kim Rush Lynch, Dale Johnson, Nicole Cook, Ginger Myers (2019) From Surviving to Thriving: Strategies for Urban Farm Success, University of Maryland Extension, p. 24, 27, 33, 37, 50 – 52, 56 -58, 60, 62
22. CityZen project (2022), Cityzen handbook: Urban farming policies and practices, CityZen project, p.5. Curtis Stone (2016) The urban farmer – Growing food for profit on leased and borrowed land, New Society Publishers, Gabriola Island, p.74, 337-338
23. "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by the Science Communication Unit, The University of the West of England, Bristol https:// environment.ec.europa.eu/news/more-consistent-policy-support-needed-urban-agriculture-flourish-2023-10-04_en, 23.11.2023.
24. Atchley, K. (2013): Hot Composting with the Berkeley Method. Kerr Center for Sustainable Agriculture. Date retrieved: February 22, 2022, from: http://www. kerrcenter. com.
25. Filipovic, V., Dimitrijevic, S., Markovic, T., Radanovic, D. (2013): Construction of composter on production and processing unit of the institute for medicinal plant research "Dr Josif Pančić". XIII Congress of Serbian soil science society and first international "Soil – water – plant". Serbian Soil Science Society and Institute of Soil Science, Belgrade. Belgrade, 23-26 September. Proceedings, 373–382. UDC 631.17: 631.86
26. Filipović, V., Ugrenović, V. (2013): The Composting of Plant Residues Originating From the Production of Medicinal Plants. International Scientific Meeting „Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region - Achieving regional competitiveness ". Editors: Drago Cvijanović, Jonel Subić, Andrei Jean Vasile. The Institute of Agricultural Economics Belgrade. Topola, Serbia, hotel „Oplenac", December 5-7th. Economics of agriculture, Thematic proceedings, 1283–1301. ISBN 978-86-6269-026-5
27. Filipović, V., Ugrenović, V., Radanović, D., Marković, T., Popović, V., Aćimović, M., Sikora, V. (2016): Morphological features, productivity and quality of pot marigold (*Calendula officinalis* L.) cv. "Domaći oranž".

III International Congress “Food Technology, Quality and Safety” and XVII International Symposium „Feed Technology“ (FoodTech), Institute of Food Technology, Novi Sad (FINS), Novi Sad Fair Congress Centre Master, Novi Sad, Serbia, from 25th to 27th October. Proceedings, 525–530. ISBN 978-86-7994-050-6
28. Filipović, V., Koković, N. (2022): Metod brzog kompostiranja. U: Ugrenović, V. (ur.) Inovativne metode organske proizvodnje za veću klimatsku neutralnost poljoprivrede. Institut za zemljište, Beograd, 75–93. ISBN 978-86- 911273-7-4
29. Filipović, V. (2022): Manual about organic production of medicinal and aromatic plants. National Association for Organic Production Development „Serbia Organica”, Belgrade and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). ISBN-978-86-88997-20-1
30. Filipović, V., Simić, I., Ugrenović, V. (2022): Manual about plant protection and plant nutrition products in organic production. National Association for Organic Production Development “Serbia Organica”, Belgrade and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). ISBN-978-86-88997-22-5.
31. Filipović, V., Ugrenović, V., Rogoznica, N., Šušteršić, L., Ilchev, A., Samardziev, D. (2023): Urban farming in North Macedonia, Serbia, Croatia and Bulgaria. Forum Center for Strategic Research and Documentation (CSRD), North Macedonia, National Association for Organic Production Development “Serbia Organica”, Serbia, NGO for promotion of organic farming, environmetal protection and sustainable development “Eko-Zadar”, Croatia, Association Bulgarian School of Politics “Dimitry Panitza”, Bulgaria.
32. Filipović, V., Ugrenović, V., Popović, V., Dimitrijević, S., Popović, S., Aćimović, M., Dragumilo, A., Pezo, L. (2023): Productivity and flower quality of different pot marigold (*Calendula officinalis* L.) varieties on the compost produced from medicinal plant waste. Industrial Crops and Products, 192, 116093. ISSN 0926-6690, https://doi.org/10.1016/j.indcrop.2022.116093. Elsevier BV, Amsterdam, Netherlands
Kessler, R. (2013): Urban gardening: managing the risks of contaminated soil. Environmental Health Perspectives, 121(11-12), https://doi.org/10.1289/ehp.121-A326, A326 - A333.
33. Saljnikov, E., Ugrenović, V. (2022). Poljoprivreda u promenljivoj klimi i njena uloga u sekvestraciji ugljenika. U:Ugrenović, V. (ured.), Inovativne metode organske proizvodnje za veću klimatsku neutralnost poljoprivrede. Instituta za zemljište Beograd, Srbija, 31-52. ISBN: 978-86-911273-7-4
34. Ugrenović V., V. Filipović, Đ. Glamočlija, J. Subić, M. Kostić, R. Jevđović (2012): Pogodnost korišćenja morača za izolaciju u organskoj proizvodnji. Field and Vegetable Crops research. 49(1), 126-131. DOI:10.5937/ratpov49-1138.
35. Ugrenović V., V. Filipović, Đ. Glamočlija, B. Jovanović (2010): Organsko seme - proizvodnja i sertifikacija na oglednom polju Instituta ˝Tamiš˝ Pančevo. Selekcija i semenarstvo, 16(1), 55-62.
36. Ugrenović, V., Pivić, R. (2021). Inovativne metode za održivo korišćenje zemnjišta u proizvodnji povrća u zaštićenom prostoru. U: Kljajić, N. (ured.) Tehno i agroekonomska analiza prednosti i nedostataka šire primene inovativnog načina podpovršinskog kapilarnog navodnjavanja u poljoprivrednom sektoru. Instituta za ekonomiku poljoprivrede Beograd, Srbija, 63-91. ISBN 978-86-6269-098-2
37. Behdad Alizadeh, James Hitchmough, (2019) “A review of urban landscape adaptation to the challenge of climate change”, International Journal of Climate Change Strategies and Management, Vol. 11 Issue: 2, pp.178-194, https://doi.org/10.1108/IJCCSM-10-2017-0179
38. https://air.sofia.bg/bg/article/255360-sazdavame-novi-tsvetni-resheniya-i-figuri-v-zeleni-prostranstva-na-sofiya-kaza-zamkmetat-desislava-bileva
39. https://botanika.bg/article/gubena-gradina-v-gradski-usloviia-273
40. https://extension.umd.edu/resource/chapter-1-urban-production-systems
41. https://frontporchne.com/article/aquaponics-taking-root-urban-farm/
42. https://getgrowee.com/hydroponic-farming-vs-vertical-farming/
43. https://homegardentt.com/%d0%b3%d1%80%d0%b0%d0%b4%d0%b8%d0%bd%d1%81%d0%ba%d0%b8-%d1%86%d0%b5%d0%bd%d1%82%d1%8a%d1%80/

44. https://kids.frontiersin.org/articles/10.3389/frym.2022.701756
45. https://mushroomgrowing.org/mushroom-cultivation-urban-agriculture/
46. https://newseu.cgtn.com/news/2020-07-13/Europe-s-largest-rooftop-farm-gets-growing-again-after-lockdown-S608xV1WZG/index.html
47. https://projects2014-2020.interregeurope.eu/cityzen/news/news-article/11981/hydroponics-and-its-role-in-urban-agriculture/
48. https://www.agritecture.com/blog/2018/3/14/why-rooftop-farming-is-the-best-solution-for-smarturban-agriculture
49. https://www.archdaily.com/916757/urban-farming-food-production-in-community-parks-and-private-gardens
50. https://www.cropin.com/vertical-farming
51. https://www.eli.org/vibrant-environment-blog/aeroponics-sustainable-solution-urban-agriculture
52. https://www.foodunfolded.com/article/aquaponics-sustainable-urban-farming
53. https://www.foodunfolded.com/article/aquaponics-sustainable-urban-farming
54. https://www.freightfarms.com/urban-farming
55. https://www.gulfagriculture.com/vertical-aeroponics-farming-sustainable-viable-profitable-future-of-farming/
56. https://www.milkwood.net/2016/05/30/growing-mushrooms-city/
57. https://www.the-urban-farmer.co.uk/urban-orchards.html
58. https://www.urbangreenup.eu/solutions/urban-orchards.kl
59. https://www.urbinati.com/en/hydroponic-culture-vertical-farming/
60. Luiz H. David, Sara M. Pinho, Feni Agostinho, Jesaias I. Costa, Maria Célia Portella, Karel J. Keesman, Fabiana Garcia, Sustainability of urban aquaponics farms: An emergy point of view, Journal of Cleaner Production, Volume 331, 2022, 129896, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro. 2021.129896.

Note: The suggested materials can be used by the educators to prepare their own concepts, materials, presentations, etc. for the purposes of the curriculum.

Note about where to obtain these materials (filled by the trainer)

LIST ANY REQUIRED MATERIALS OR EQUIPMENT (E.G. LAB NOTEBOOK, SPECIFIC CALCULATOR, ETC).

- PC/notebook with access to internet;
- LCD projector;
- Blackboard and paper;
- Flipchart
- Technical equipment corresponding to the module (protective clothing, appropriate mechanization and equipment, as well as tools needed for successful realization of the curriculum).

COURSE GRADING: CRITERIA FOR PASSING THE EXAM AND EXPLANATION OF GRADING SYSTEM

Assessment of the learning outcomes is an integral part of this course. Through the basic training the trainees should have gained sufficient knowledge and build up competencies in the field of urban farming. Student assessment should reflect the overall goals of the course and the learning accomplished in the classes and assignments. Before organizing the assessment process, the trainer should help students understand the final exam, explain the purpose of the final exam and review the course goals and explain how is intended to be measured these goals.

The final exam should be:

- a motivation for students to review what they have learned in the course;
- an opportunity for students to think about and process course material at a deeper level;
- a chance to measure students' learning outcomes of the course's learning goals.

The final exam will consist of a written text/exam. The examination will include topics covered in the course.

It will consist of 40 questions.

Pass criteria:

Excellent: 100-92%
Very good: 92-81%
Satisfactory: 81-67%
Sufficient: 67 – 50%

Fail criteria:

Performance below expectations where student shows some or no basic knowledge: below 50%

PRELIMINARY SCHEDULE OF TOPICS, READINGS, AND ASSIGNMENTS

Week	Description	
INTRODUCTION		
1	Literature	Urban farming for beginners, 2023
	Lecture Content	**Introduction to Urban farming** The concept of urban farming has emerged as a vital bridge between the rural agricultural heritage and the urban present. The concept of urban farming stands as a beacon of hope and offers practical approaches to tackling present and future food supply challenges. Urban farming is more than just a trend; it represents a movement with the potential to transform the way we engage with food production, our communities, and the environment. The Course will encompass a wide range of topics and practical advice, designed to cater to beginners and seasoned urban farmers alike. 1. Understanding the Basics 2. Plant Selection and Care 3. Embracing Sustainability 4. Expanding Possibilities 5. Fostering Community Engagement 6. Troubleshooting and Problem-Solving 7. Harvesting and Preserving 8. Beyond Your Farm
	Teaching methodology	Lecture combined with interactive teaching, consultation, class discussion
	Assignments	Short verbal or power point presentation on the topic of basic principles of urban farming. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions
Learning outcome	Knowledge/understanding of the concept, theory and basic principles of urban farming.	
Number of hours	2	

Lectures	1	
BENEFITS OF URBAN FARMING		
2	Literature	Urban farming for beginners, 2023
	Lecture	**Agroecology in The City: The Environmental Benefits of Urban Farming**
	Content	One of the most impactful aspects of urban farming lies in its potential to address critical environmental challenges faced by modern cities. As urbanization continues to grow, it is crucial to recognize and leverage these benefits to mitigate the impact of cities on the planet. Main environmental benefits: - Sustainable Land Use - Ecological Footprint Reduction and Carbon Sequestration - Air Quality Improvement - Biodiversity Enhancement - Efficient Water Management - Improved Soil Health - Waste Reduction - Energy Efficiency - Reduction in Pesticide Use: - Increased Greenery Urban farming is more than just a trend. It is a transformative practice that addresses various environmental challenges facing the increasingly urbanized world. Urban farming is not just about growing food; it's about cultivating a more sustainable and resilient future for our cities.
	Assignments	Short verbal or power point presentation on the environmental benefits of urban farming. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions
Learning outcome	Students will understand the eco-benefits of practicing urban farming and learn more about climate change and the dangers to our planet.	
Number of hours	2	
Lectures	1	
3	Literature	Urban farming for beginners, 2023

	Lecture Content	**Nurturing A Resilient Community: The Social Benefits of Urban Farming** In the food deserts of modern cities, where social connections can feel fleeting and a sense of community can be elusive, urban farming emerges as a vibrant movement embedded in social interaction and shared purpose. Urban farming operations, encompassing everything from rooftop gardens and community plots to windowsill herb boxes, offer a surprising array of social benefits that extend far beyond the joy of harvesting fresh produce. From community building to education and empowerment, urban farming serves as a catalyst for positive social change in our urban environments. This lecture will explain the social benefits of urban farming, shedding light on how it brings people together, enriches their lives, and contributes to the fabric of society. Main social benefits include: - Community Building - Enhancing Food Access and Security - Maintaining Mental and Physical Well-being - Education and Empowerment: - Cultivating Cultural Diversity - Sense of Ownership - Inter-generational Bonds - Community Resilience - Local Economy and Entrepreneurship - Civic Engagement The social benefits of urban farming are undeniable. Urban farming is a vehicle for positive social change, it brings people together, enhances their quality of life, and empowers them to take an active role in shaping their communities.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation on the social benefits of urban farming
	Student work	Active listening, participation, discussion, questions, presenting
	Learning outcome	Students will understand the social benefits of practicing urban farming

Number of hours	2	
Lectures	1	
4	Literature	Urban farming for beginners, 2023
	Lecture	**From Soil Biota to Human Microbiome: The Health and Wellness Benefits of Urban Farming**
	Content	Urban farming goes beyond producing fresh food in the city; it has a profound impact on individual health and well-being. In this chapter, we will explore the diverse health and wellness benefits of urban farming. From access to fresh, healthy food to physical activity and stress reduction, urban farming is a practice that enriches the lives of urban dwellers, nurturing not only their bodies but cultivating a worldview of mutual aid. Urban farming offers a unique opportunity to be outdoors, all while reaping a multitude of physical and mental health benefits from the cultivation of nourishing crops. In the midst of bustling cityscapes, these agricultural havens offer much more than just fresh produce; they provide a pathway to a healthier and more fulfilling life. The main benefits: - Food security - Access to Fresh Food - Reduction in Food Contaminants - Better Dietary Choices: - Increased Physical Activity - Better Weight Management: - Improved Mental Health - Increased Social Interaction - Enhanced Connection with Nature Urban farming is a practice that nurtures health and wellness on multiple levels. It provides access to fresh, healthy food, encourages physical activity, reduces stress, and promotes mental well-being. By practicing urban farming, individuals not only improve their own health but also contribute to the creation of healthier, more resilient urban communities in synergy with the environment.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.

	Assignments	Short verbal or power point presentation on the health and wellness benefits of urban farming
	Student work	Active listening, participation, discussion, questions, presenting
	Learning outcome	Students will understand the health and wellness benefits of practicing urban farming
Number of hours	2	
Lectures	1	
5	Literature	Urban farming for beginners, 2023
	Lecture	**Sowing the Seeds of Prosperity: The Economic Benefits of Urban Farming**
	Content	Urban farming offers a vast array of economic benefits that extend far beyond the individual gains of harvesting fresh produce. In this chapter, we will explore the diverse economic benefits of urban farming, ranging from income generation to entrepreneurship opportunities, job creation, and cost savings. From creating green jobs and boosting local economies to enabling sustainably functional food systems, developing resilient communities, and enhancing property values, these urban farms might provide means of quietly transforming the harsh economic landscapes of cities. Urban farming's economic contributions not only provide financial advantages but also play a crucial role in building a regenerative and resilient urban future. Economic benefits include: - Income Generation - Entrepreneurial Opportunities - Job Creation - Resilient Local Economies - Reduced Food Expenses - Cost Savings on Transport - Functional Food Systems and Increased Food Security - Enhanced Property Values The economic benefits of urban farming are evident and extend beyond the individual level, making it a powerful force for building economic resilience within communities. By generating income, fostering entrepreneurship, creating jobs,

		and contributing to local economic development, urban farming not only enriches the lives of those involved but also helps build stronger and more resilient urban economies. Besides boosting local economies, enhancing property values, and reducing healthcare costs, urban farming aims at food security and perhaps food sovereignty. Urban farming might be also setting the foundations of Local Exchange Trading Systems (LETS), introducing circular economy or even degrowth as a concept. As we strive to build thriving and functional cities, urban farming might present itself as a powerful tool for economic rethinking, offering alternative models for our communities to regenerate in the future. In the following chapters, we will continue to explore the various facets of urban farming and its positive influences on individuals, communities, and the environment.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation on economic benefits of urban farming. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions, presenting
	Learning outcome	Students will understand the economic benefits of practicing urban farming
Number of hours	2	
Lectures	1	
ORGANIZATION, MANAGEMENT AND MARKETING STRATEGY		
6	Literature	Urban farming for beginners, 2023
	Lecture Content	**Planning process** For the success of the urban farm, the planning process is essential. Before registering the farm, which is the last step, there are 9 steps for the for the urban farmer to take; exploring the legal environment i.e. familiarizing with all the relevant laws, bylaws and other regulations, deciding the business model (profit or non-profit), deciding the method of agricultural production, making a farm (garden) plan, defining a target market, calculate expenses, calculate cash flow, evaluate the management and write a business plan.

	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation of one of the steps within the planning process. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions, presenting.
Learning outcome	○ Understanding of the necessity of doing the thorough planning before registering the urban farm ○ Gaining practical knowledge of the steps of planning process	
Number of hours	3	
Lectures	1	
7	Literature	Urban farming for beginners, 2023
	Lecture Content	**Market** A market is an environment in which the exchange of goods or services between buyers and sellers occur. To take part in this large environment of customers in search for farming produce, urban farmer has to define the market niche, that is to find customers recognizing the values that their produces represent and willing to buy it for a requested price. The marketing plan is a tool for an urban farmer to target the desired market niche. The marketing plan was initially composed of four elements, so-called four Ps; product, price, place and promotion, but these elements expanded to include people, processes and physical evidence. They represent different areas of focus (also called marketing mix) in creating a marketing plan.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation of the elements of the marketing plan. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions, presenting
Learning outcome	○ Understanding the principles of marketing planning ○ Gaining practical knowledge of making the marketing plan for the urban farm.	

Number of hours	2	
Lectures	1	
8	Literature	Urban farming for beginners, 2023
	Lecture Content	**Customers, products, distribution, sales and pricings, competition and promotion** For an urban farm, there would be three markets to deal with; consumers' market – individuals and households buying the products for themselves, retailers such as specialised shops and restaurants. Before launching a new product, it's crucial to determine how it responds to customers' demands in the given moment. Distribution plan regards setting up distribution channels for the farm's produce. The basic knowledge the farmer has to acquire before writing it is to know where the customers are located and how to reach them in the manner that conserves produce's quality. Sales plan consists in describing how long each produce will be available to customers and the estimation of the sales volume for the given produce. The price for each product must fall between two points: what the customer is willing to pay and the point at which farmer starts losing money. There are three types of competitors to take into consideration; competitors selling similar products, those competing for the same customers and future competitors. The farmer must realistically examine the advantages and disadvantages of their products in comparison to the competition's. The promotion includes all activities of communication with the customers and potential customers regarding the products the farm wants to sell. According to the habits of the targeted customers, the farmer needs to choose the promotion channels.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation of one or more topics covered in this lesson. Assignment can be performed by a single student or a group.

	Student work	Active listening, participation, discussion, questions, presenting.
	Learning outcome	○ Understanding the process of reaching the (potential) customers through market research, defining the product, setting up distribution channels, forming the prices and promotional activities. ○ Understanding the reciprocal feedback link with the competition
Number of hours	2	
Lectures	1	
PRODUCTION PRACTICES AND APPROACHES		
9	Literature	Urban farming for beginners, 2023
	Lecture Content	**Provision of physical, human resources and soil** In urban agriculture, it is particularly important to provide physical and human resources, as well as the soil on which production will take place. Physical resources include buildings and equipment necessary for the production and sale of raw materials, semi-finished and final products. These resources include: water, electricity and the effects that the farm can have on the environment (eg generation and disposal of the resulting waste). Human resources are of primary importance for the success of urban agriculture. For this purpose, in addition to seasonal labor, in some cases it is necessary to provide workers in charge of administration, marketing and finance. In urban agriculture, soil has added value because there is little of it for food production, and its utilization is high. In a short period of time, urban farmers produce large quantities of food on a small area, which additionally depletes nutrients and deteriorates the soil structure, so soil management in urban agriculture is very important.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation on the physical, human resources and soil. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions, presenting

Learning outcome	○ Knowledge will be gained about the provision of physical resources, examples that are present in urban agriculture. ○ Knowledge will be gained about the provision of human resources, examples that are present in urban agriculture. ○ Knowledge will be gained about securing soil and its importance for urban agriculture.	
Number of hours	3	
Lectures	1	
10	Literature	Urban Farming for Beginners, 2023
	Lecture Content	**Composting** In urban production, composting is one method that is widely used for the production of high-quality organic fertilizer - compost. Compost is an organic fertilizer and soil improver produced by controlled biooxidative decomposition of various mixtures composed of various plant residues, sometimes mixed with organic fertilizers and/or animal residues, and contains limited amounts of mineral substances. As in organic production and in urban agriculture, composting is recommended as a bioagrotechnical measure primarily for the treatment of waste generated in the production of plants and from the household, but also for the control of weeds, pests and diseases. A large number of videos, newspaper articles, brochures promote urban composting, as a measure that promotes the principle of "zero waste", i.e. production without waste.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation on the composting and compost. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions, presenting.
	Learning outcome	○ To gain knowledge about the benefits of composting and compost, that is, about the process of selecting suitable waste for composting, as well as the ways of their care and use. ○ A significant part of the education will be related to techniques, i.e. composting methods used by urban farmers (for example, rapid or hot composting, the so-called Berkeley Method).

Number of hours	2	
Lectures	1	
11	Literature	Urban farming for beginners, 2023
	Lecture Content	**Crop rotation** Crop rotation is a planned system of plant production in which the composition and ratio of areas under crops is constant for a long time. Plant species alternate in time and space in a fixed order. In urban agriculture on small areas, there is a more intensive change of crops in time and space. The largest number of plant species are vegetable species, primarily because they are used fresh for food, but also later as raw material for processing. Vegetable production in crop rotation is a mandatory measure in urban production and represents one of the most significant preventive and bioagrotechnical measures in this type of production. Choosing the appropriate crop rotation in crop production ensures: maintenance of soil fertility, reduction of weeds, reduction of the number of pests and plant disease agents, microbiological activity of the soil, reduction of leaching of nutrients, maintenance of populations of useful animal species.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation on the crop rotation. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions, presenting
	Learning outcome	○ Getting to know the importance and role of crop rotation in urban production, ○ Through practical work, acquiring knowledge for planning and applying crop rotation. ○ Understanding the purpose of using green fertilization and catch crops plants in urban agriculture.
Number of hours	4	
Lectures	2	
12	Literature	Urban Farming for Beginners, 2023
	Lecture	**Collecting and storing seeds - hobby seed farming**

	Content	As one of the goals of sustainable development is the preservation of biodiversity in urban agriculture, priority is given to the use of domestic and domesticated, old varieties. Local crops are particularly important because during cultivation, they adapted over time to the existing ecological conditions (climate, soil), to biotic factors (pests, disease agents) and to local technologies. Urban farmers as small producers can be engaged in the preservation and maintenance of local plant populations and the exchange of their seeds. This type of preservation and maintenance is called *in situ* or *on-farm* conservation and is gaining more and more importance in the world. An urban producer can produce seeds on his own land, however, it is known that many plant diseases and weeds are transmitted by seeds, so special attention must be paid to the health status, purity and germination of such seeds, but also to preserving the identity of the variety he grows.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation about collecting and saving seeds.
	Student work	Active listening, participation, discussion, questions, presenting.
	Learning outcome	○ Understanding the importance of biodiversity conservation ○ Knowledge of basic concepts from seed production: species, variety, seeds, fertilization, crossing. ○ Practical knowledge of seed selection, collection and storage.
Number of hours	2	
Lectures	1	
13	Literature	Urban Farming for Beginners, 2023
	Lecture Content	**Control of weeds, diseases and harmful organisms** **Weed control** - Weeds are plant species that have adapted over time to cultivated plants and agrotechnical measures, which have been applied for a long time, so it can be said that they are not accidental companions of cultivated plants. They compete with crops for space, light and nutrients and can significantly reduce the yield and quality of cultivated plants. Proper crop

		rotation, mulching, and tillage without overturning can significantly reduce the number of weeds on production areas, however, the use of human labor for hoeing and weeding cannot be avoided. The success of crop production largely depends on the success of weed control. **Flower protection belts** - As part of bio-agrotechnical measures in the bio-garden, flower protection belts are formed and crops are combined using friend plants. In the family bio-garden, a protective belt is formed from flowering and medicinal aromatic plant species. They have the function of attracting beneficial insects (pollinators, predators), that is, they can be trap plants for diseases and pests, as part of biological protection measures. **Natural preparations for strengthening and healing plants** - In addition to industrially produced preparations, plant preparations made on the farm are largely used in organic production. These preparations have an insecticidal, bactericidal and fungicidal effect. In addition to their protective role, a large number of these preparations are also used to feed cultivated plants. Natural preparations are made from medicinal, aromatic, spice plants, vegetables, weeds and other plants. Properly used, they ensure a healthy and high-quality yield, that is, acceptable and sustainable production for humans and the environment.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation on measures to control weeds, diseases and harmful organisms.
	Student work	Active listening, participation, discussion, questions, presenting.
	Learning outcome	○ Knowledge of weed species and their biology, methods of tillage and crop care in order to control them. ○ Types of flower protective belts, methods of establishment and the benefits they bring. ○ Practical knowledge about the action, preparation and application of natural plant preparations for strengthening and healing plants.
Number of hours	3	
Lectures	3	

14	Literature	Urban Farming for Beginners, 2023
	Lecture Content	**Formation and maintenance of urban gardens** In urban production, it is necessary to have a production plan. Also, the work calendar should be respected. One of the important items when dealing with urban production is soil cultivation, which should be carried out in the best way and at the optimal time, so that other agromeasures can be carried out as well as possible in order to obtain the highest possible yield of cultivated plants in urban agriculture. Adherence to the set sowing and planting dates, as well as care measures (hoeing, watering, fertilizing, etc.) is of great importance for the successful practice of urban agriculture. Knowledge of production technologies of different plant species is another aspect of dealing with this type of production. In the end, the complete success in growing vegetables in the conditions of urban agriculture depends on timely harvesting, and the method and length of storage.
	Teaching methodology	Lectures combined with interactive teaching, consultation, class discussion, small group work, and mentoring work with students.
	Assignments	Short verbal or power point presentation on the necessary techniques for the formation and maintenance of an urban garden in urban agriculture. Assignment can be performed by a single student or a group.
	Student work	Active listening, participation, discussion, questions, presenting
	Learning outcome	○ Knowledge of soil cultivation techniques, sowing and planting, and care measures in urban agriculture. ○ Basic information about growing different types of vegetables in urban agriculture. ○ Acquiring knowledge about harvesting and storing different types of vegetables in urban agriculture.
Number of hours	6	
Lectures	3	
URBAN FARMING PRODUCTION SYSTEMS		
15	Literature	Urban farming for beginners, 2023
	Lecture	**Horizontal Urban Farming**

	Content	Urban community agriculture most often occurs on empty land - private or public - or in areas such as squares, parks, schools. Some municipalities offer fiscal and legal incentives for the use of public, private and rural urban land for agriculture. Increasingly, city halls have been adopting this practice to meet a demand from the communities and offer a differential to improve the quality of life in the city, contributing to the urban requalification, the environment and health. There are different methods of growing crops in urban farming including ground-based outdoor urban farming, rooftop farming, landscaping and nursery businesses, urban orchards. Understanding the advantages from an economic, health and environmental perspective is of extreme importance for selecting the right urban farming options for a particular location. This depends on location, alternative sources of food, and local income levels.
	Teaching methodology	The module is delivered using a mix of methods. The theoretical part is followed by practical task where the trainees individually or in groups practice the acquired knowledge.
	Assignments	Short verbal or power point presentation on the methods for horizontaly growing crops in urban farming. Assignments can be individual or in groups.
	Student work	Active listening, participation, discussion, presenting.
Learning outcome	○ After the completion of the module, the trainees will have theoretical knowledge about the horizontal methods of growing crops in urban conditions.	
Number of hours	3	
Lectures	1	
16	Literature	Urban farming for beginners, 2023
	Lecture Content	**Vertical Urban Farming** In contrast to traditional horizontal farming, vertical farming is a method in which crops are grown on top of each other. Thus, vertical farming saves space and allows for more plants to be grown per square meter. Vertical farming refers to the system of cultivating crops in vertically stacked layers, instead of a single surface, like a greenhouse or field. Generally, cultivators incorporate these into vertical structures, such as shipping barrels, skyscrapers, used warehouses, and abandoned mine shafts. Vertical farming

		uses soilless agriculture, such as aquaponics, aeroponics, and hydroponics.
	Teaching methodology	The module is delivered using a mix of methods. The theoretical part is followed by practical task where the trainees individually or in groups practice the acquired knowledge.
	Assignments	Short verbal or power point presentation on the methods for verticaly growing crops in urban farming. Assignments can be individual or in groups.
	Student work	Active listening, participation, discussion, presenting.
Learning outcome	○ After the completion of the module, the trainees will have theoretical knowledge about the vertical methods of growing crops in urban conditions.	
Number of hours	2	
Lectures	1	
17	Literature	Urban farming for beginners, 2023
	Lecture Content	**Urban Livestock and Beekeeping** Recently, there is huge interest in food security and local food production systems. Therefore, more and more residential areas are amending their animal control and zoning codes to allow the keeping of chickens, bees, goats, and other animals. The benefits of urban livestock include the production of fresh, local food products such as eggs, honey, and milk, the important pollination roles played by bees and the companionship and educational aspects of keeping such animals as pets. However, potential downsides include noise, odor, and disease concerns, so appropriate regulations are important to protect communities from nuisance or public health complaints.
	Teaching methodology	The module is delivered using a mix of methods. The theoretical part is followed by practical task where the trainees individually or in groups practice the acquired knowledge.
	Assignments	Short verbal or power point presentation on the methods for urban livestock and beekeeping. Assignments can be individual or in groups.
	Student work	Active listening, participation, discussion, presenting.

	Learning outcome	After the completion of the module, the trainees will gain an understanding of the how and why of urban livestock and beekeeping, where it came from and its importance.
Number of hours	3	
Lectures	1	
18	Literature	Urban farming for beginners, 2023
	Lecture Content	**Mushroom production (fungiculture)** One crop that has emerged as a popular choice for urban farms is mushrooms. Not only are mushrooms highly nutritious, but they are also a sustainable food source that can be grown using waste products and require minimal resources. As a result, many urban farms are choosing to grow and sell mushrooms as a way to promote sustainable agriculture and provide fresh, local food to their communities.
	Teaching methodology	The module is delivered using a mix of methods. The theoretical part is followed by practical task where the trainees individually or in groups practice the acquired knowledge.
	Assignments	Short verbal or power point presentation on the methods for urban mushroom production. Assignments can be individual or in groups.
	Student work	Active listening, participation, discussion, presenting.
	Learning outcome	After the completion of the module, the trainees will: ○ be able to describe the basics of urban mushroom production and harvesting, ○ have knowledge about the infrastructure needs and options for urban cultivation.
Number of hours	2	
Lectures	1	

Disclaimer:

The trainer reserves the right to make modifications to this information throughout the course

This curriculum is part of an educational package aiming at the training of farmers/educators from North Macedonia, Serbia, Croatia and Bulgaria. It has been developed within the framework of the project "Urban farming education for sustainable future" supported by the European Commission's Erasmus+ Programme (Key Action 2 - KA 204 - Strategic partnerships for adult education).

Co-funded by the European Union

This project has been funded with support from the European Commission. This curriculum reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.