Co-funded by the Erasmus+ Programme of the European Union

Curriculum draft

(WP2 - Deliverable 2.1)

Project Acronym:	**BUGI**
Project Full Title:	**Western Balkans Urban Agriculture Initiative**
Project No.:	**586304-EPP-1-2017-BA-EPPKA2-CBHE-JP**
Funding Scheme	**Erasmus Plus**
Coordinator:	**University of Sarajevo**
Project Start Date:	**October 15, 2017**
Project Duration:	**36 months**

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Table of content

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the
Erasmus+ Programme
of the European Union

Document control sheet

Title of Document:	**Curriculum draft (WP2 – Deliverable 2.1)**
Work Package:	**WP 2 Curriculum modules and LLL center programs development**
Last Version Date:	**10.06.2019**
Status:	**Final**
Document Version:	**v.04**
File Name:	**Deliverable2.1_Curriculum draft.docx**
Number of Pages:	**70**
Dissemination Level:	**Internal**

Versioning and contribution history

Version	Date	Revision Description	Partner responsible
v.01	12-12-2018	First draft version	Giuseppina Pennisi (UNIBO)
v.02	19-12-2018	Second draft version	Pakeza Drkenda (UNSA)
v.03	03-01-2019	Third draft version	Giuseppina Pennisi (UNIBO)
v.04	10-06-2019	Final version	All (adopted)

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

1. Introduction WP2 "Curriculum modules and LLL center programs development": General description and objectives

WP2 "Curriculum modules and LLL center programs development" includes the activities necessary for design and implementation of new master study curriculum and LLL programs on urban agriculture. The curriculum is two years study program with 120 ECTS with basic obligatory modules and closed list of elective modules to provide specialization. Study contents are organized in 5 modules: introduction to UA, food production systems, UA entrepreneurship, urban planning and resources, and use of technologies and ICT in UA. Modules meet objectives and priorities for each partner countries' needs based on results delivered in WP1. Needs analysis (see Deliverable 1.2) named communication a required soft skill for urban agriculture entrepreneurship and an issue to be covered in urban agriculture entrepreneurial education. Other soft skills considered important were creativity, time management, and flexibility. Considering hard skills, all subjects (plant production, machinery/engineering, marketing/trading, project planning, business planning, communication and networking, urbanity) are named by more than 40% of the surveyed people to be of value for UA entrepreneurial education. About two thirds named plant production (68%) and project planning (65%) followed by marketing / trading (53%), urbanity (51%), communication/networking (50%), and business planning, administration and finances (50%). Also specific training needs among these topics were investigated. Crop protection, plant nutrition and cultivation practices were the most required skills in the topic of plant production. Irrigation, greenhouse technology and precision agriculture were the most required skills in the topic of machinery/engineering. Quality management and customer relations were the most required skills in the topic of marketing/trading. Business, project planning and project management were the most required skills in the topic of business, administration and finances. Urban economy and urban planning were the most required skills in the topic of urbanity.

Within WP2 modules and modes (basic or advanced), objectives and learning outcomes for master study and LLL program are defined through the development of a curriculum draft (Deliverable 2.1). Modules 2, 3, 4 and 5 is offered in two modes: basic and advanced. Basic mode provides more theoretical education, while advanced is based on Problem Based Learning system (PBL) and Experiential Learning (EL). Thanks to a specific guide (Deliverable 2.2), a methodology for PBL and EL with regard to defined learning outcomes and competencies is established. A guide for students' skills and competence evaluations is created to define and describe a competence inventory and link it to the skills (Deliverable 2.3). This reference system is the core instrument both for planning and for the validation of the competence oriented learning. Module Placement Guide (Deliverable 2.5) assess student's current readiness to register for advance mode courses within the modules. This is necessary due to the interdisciplinary nature of new curriculum. Since module advance mode is based on PBL and EL, students are expected to have theoretical knowledge regarding field of the study prior to the course registration. Diploma supplement providing a standardized description of the nature, level, context, content and status of the

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

studies is created for partner HEIs (Deliverable 2.6). Besides standard context, a special part includes descriptions of acquired competencies according to the EUROPASS cluster: social and organizational competences described in the field of study. A multilateral inter-institutional agreement (Deliverable 2.7) ensures credit mobility, virtual and physical students and staff mobility between the partner HEIs.

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

2. Curriculum draft

2.1 Master on Urban Agriculture

The Master on Urban Agriculture is a two years master of 120 ECTS. It aims to train professional specialized in the field of urban agriculture and its related sciences in order to build cities more sustainable, more resilient and greener and to develop new economies related to urban agriculture activities. This master points to provide advanced knowledge in the field of urban agricultural systems, skills to develop and manage sustainable production systems, knowledges on urban planning and urban regulations, and expertises in urban agriculture business models. Fundamental importance within the master have the learning techniques related to Problem Based Learning (PBL) and Experiential Learning (EL), which promote the development of critical thinking skills, problem-solving abilities, and communication skills.

2.2 Target Skills

- To acquire and develop knowledge and skills related to urban agriculture, urban ecology and urban planning
- To identify and assess entrepreneurial opportunities and innovation possibilities related to urban agriculture activities
- To understand and explore the multifunctionality of urban agriculture in order to redesign and redefine urban spaces
- To establish the skills needed to organize and lead multi-disciplinary groups with experts, including planning, setting up, coordinating, team working, business development, problem-solving skills
- To plan green areas within the city framework
- To write a business plan for development and management of economical activities
- To analyse cities' food supply system and be able to shorten the food supply chain

2.3 Career opportunity

Urban planner specialized in greener cities;
Manager of project related to urban agriculture activities;
Consultant or researcher specialized in the deployment of sustainable planning techniques, methods and strategies in urban areas;
By completing the master study program students acquire competence for their inclusion in the specialized academic and doctoral degree programs related to the same or simmilar field study.

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

2.4 Course program

Two different master programs are developed. The first one is promoted by the University of Sarajevo (UNSA), the University "Dzemal Bijedic" Mostar (UNMO) and the University Donja Gorica (UDG). The second one is promoted by the University of Prishtina (UP) and the University of Haxhi Zeka in Peja (UHZ).

The programs are structured in four semesters.

First semester (30 ECTS) is common among the two programs and courses (all mandatory) are provided in English language and in distance learning modality.

Second semester (30 ECTS) offers different courses in the two programs, but in both programs, mandatory and elective courses are present.

For both programs, third semester (30 ECTS) is organized for internship and problem based learning activities and fourth (30 ECTS) is dedicated to the thesis.

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

2.5 Course structure for UNSA, UNMO and UDG

First semester – 30 ECTS (mandatory)

COURSE	ECTS
Urban agriculture: introduction, history and evolution	5
Urban food system	4
Entrepreneurship and urban demands	4
Urban ecology	4
Precision agriculture and smart food production	4
Statistics	6
Experimental methodology	3
Total ECTS	**30**

Second semester (30 ECTS – 15 mandatory and 15 elective)

COURSE	ECTS
MANDATORY (15 ECTS)	
Sustainable agriculture	3
Urban fruit and vine growing	6
Urban vegetable and field crop production	6
ELECTIVE (15 ECTS)	
Urban farming, nutrition and irrigation	3
Urban farming plant protection	3
Use and cultivation of ornamental plants	3
Aromatic and medicinal plants	3
Beekiping	3
Biogenic waste management	3
Application of GIS in Urban agriculture	3
Plant propagation in Urban Agriculture	3
Dynamic input and climate management in urban agriculture systems using informatic tools and DSS	3
Sustainable cities and eco inovation	3
Economic and organisation of UA production	3
Renewable energy sources: basics and applications	3
Total ECTS	**30**

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Third semester (30 ECTS, 18 PBL and 12 internship)

Fourth semester- Master thesis 30 ECTS

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

2.6 Course structure for UP and UHZ

First semester – 30 ECTS (mandatory)

COURSE	ECTS
Urban agriculture: introduction, history and evolution	5
Urban food system	4
Entrepreneurship and urban demands	4
Urban ecology	4
Precision agriculture and smart food production	4
Statistics	6
Experimental methodology	3
Total ECTS	**30**

Second semester (30 ECTS – 18 mandatory and 12 elective)

COURSE	ECTS
MANDATORY (18 ECTS)	
Processing of fruits and vegetables	6
Urban horticulture production	6
Technology and engineering for production in urban environment	6
ELECTIVE (12 ECTS)	
Planning and urban design	3
Cultivation of medicinal and aromatic plants	3
Information science and communication	3
Urban beekeeping	3
Plant protection in urban agriculture	3
Urban agriculture production systems	3
Total ECTS	**30**

Third semester (30 ECTS, 18 PBL and 12 internship)

Fourth semester- Master thesis 30 ECTS

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

2.7 Syllabi: first common semester

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)		
	Programme name	Urban agriculture		
COURSE				
Course name	**Urban agriculture: introduction, history and evolution**			
Course code	Semester	Status	ECTS credits	Contact hours
	I	Mandatory	5	50
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	The course introduces students to subject field, concepts and definitions related to urban agriculture, historical evolution of urban agriculture with reference to different regions: Europe, Africa, Asia, North and South America. It enables students to understand trends related to today's urban environment: models of urban agriculture trends in food consumptions, trends in city development and urban planning, territorial analysis and governance. The course defines and enables students to understand actors, stakeholders and challenges for urban agriculture development.			
Learning outcomes	Upon completion of this course, student should be able to: - Identify an adapted definition of urban agriculture depending on the objective and context - Understand the development and current status of urban agriculture in Europe, Africa, Asia and North and South America - Understand the development constant or specific forms of urban agriculture - Identify constant or specific evolution factors - Identify opportunities and constraints for urban agriculture development - Understand the objectives and main steps of an urban planning project - Use tools and methods for territorial analysis - Understand and map main actors and stakeholders in urban agriculture - Identify constant or specific forms of urban agriculture - Understand different typology and activity depending on the goal and the context.			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to course organization, teaching conditions, literature, grading.	2	
2.	Definition of urban agriculture depending on the objective and context.	2	
3.	Development constant or specific forms of urban agriculture.	2	
4.	Development and current status of urban agriculture in Europe, Africa, Asia and North and South America	2	
5.	Climate, lifestyle, demography and urban technology.	2	
6.	Urban agriculture as part of a productive urban landscape.	2	4
7.	Objectives and main steps of an urban planning project.	2	
8.	Tools and methods for territorial analysis.	2	4
9.	Challenges, opportunities and limitations for urban agriculture development. Actors and stakeholders in urban agriculture.	2	
10.	Constant or specific forms of urban agriculture.	2	
11.	Typology and activity of forms in urban agriculture.	2	
12.	Content depended activities.	2	
13.	Form depended activates.	2	
14.	Education and research in sustainable urban environments.	2	2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

15.	Field visit		10
	Total	30	20
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works (homeworks)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Katrin Bohn, Kristian Ritzmann (2015). Playing/Field Urban Agriculture: Ecological education and practice-based design. Technischen Universität Berlin.	
Erasmus +, UrbanGreenTrain, http://www.urbangreentrain.eu/upimg/pdf/Module_1_final_version-compressed.pdf	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban food system**			
Course code	Semester	Status	ECTS credits	Contact hours
	I	Mandatory	5	50
Required pre-laid courses				

Teaching staff	Programme Director	
	Teachers	

Description	The course introduces students to UA cultivation technologies, various urban agriculture types and production systems including characteristics, location, functions, technical aspects, development challenges and support needs. The course also provides information on UA input supply, service delivery, food processing and different types of marketing of urban agriculture produce, including short food supply chains. It enables students to understand main linkages between urban agriculture, wider economy and food value chains. The course analyse links between urban agriculture and food value chains in specific cases, and defines and enables students to understand actors, stakeholders and challenges for urban agriculture value chain development.
Learning outcomes	Upon completion of this course, student should be able to: - Analyse major issues and constrains on urban food system - Identify the constrains related to the food supply chain and the main limiting factors for developing; - Identify actors and stakeholders of urban food system and food supply chain; - Understand small-scale production system in small areas - Understand traditionally rural-based enterprises adapted farm strategies to a more urban environment - Understand large-scale farms and agro-enterprises as a local economic development and urban food security at the city level - Identify potential of alternative food supply chain - Identify opportunities offered by the city in terms of market potential and access to inputs and infrastructure

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to course organization, teaching conditions, literature, grading.	2	
2.	Definition of urban food system	2	
3.	Urban food security	2	
4.	Main linkages between urban agriculture, wider economy and food value chains	2	
5.	The food value chain starting from the agricultural inputs to the final products	2	
6.	Farming sector, processing, marketing and distribution	4	2
7.	Specialized enterprises inside the UA sector like plant and animal feed producers	2	2
8.	Breeding / multiplying enterprises for plant varieties and breeding animals	2	2
9.	Small-scale production system in small areas in or on the house (balcony, windowsill, cellar, barn, rooftop, and kitchen) as well as around the house (front and backyard, patio).	2	2
10.	Traditionally rural-based enterprises adapted farm strategies to a more urban environment as a result of urban expansion	2	2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

11.	Large-scale farms and agro-enterprises as a local economic development and urban food security at the city level	2	2
12.	Farm planning and management, access to information on advanced and sustainable technologies, market information and sources of financing	2	
13.	Market potential and access to inputs and infrastructure (roads, airports, harbours) for the development of large-scale agro-enterprises	2	
14.	Consumer distribution	2	
15.	Field visit		8
	Total	30	20
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% =dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works(homework's)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Erasmus +, Urban Green Train, http://www.urbangreentrain.eu/upimg/pdf/Module_1_final_version-compressed.pdf	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in Alb. languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Entrepreneurship and urban demands**			
Course code	Semester	Status of subject	ECTS	Contact hoursi
	I	Mandatory	5	50
Required pre-laid courses				

Teaching staff	Programme Director	
	Teachers	

Description	The purpose of this course is to equip students to understand entrepreneurship, definitions about entrepreneurship in the field of Urban Agriculture, the role of entrepreneurship in creating small and medium enterprises, their function, and the importance of entrepreneurship in national economy, market economy, etc. To put the customers at the heart of your urban agriculture business idea To be aware of the food and urban food market To be able to consider consumer demands and behaviours To know about (qualitative) market research and know how to conduct the research
Learning outcomes	Upon completion of this course, student should be able to: - Identify attributer od entrepreneurs in UA - Detect customer groups relevant for the business idea; - Analyze their demands and behaviours; - Choose the right market research approach to get; - Insights into customers' thinking and decision-making

Course outline

Week No:	Course Unit	Contact Hours	
		L	E
1.	Who are the entrepreneurs?	2	2
2.	The start-up decision	2	2
3.	Understanding business success: strategy, luck and policy	2	2
4.	Financing entrepreneurship	2	2
5.	Small firms and innovation	2	2
6.	Antisocial, unlawful and criminal enterprise. Enterprise policy	2	2
7.	First Colloquium	2	2
8.	Global Competitiveness of Cities, Regional Development of cities	2	2
9.	Social Innovations, Knowledge and network in smart cities Sustainable Entrepreneurship in Cities	2	2
10.	Institutional Entrepreneurship and Urban planning , Future of smart cities	2	2
11.	Urban Agriculture Case Studies in Central Texas: From the Ground to the Rooftop by Bruce D. Dvorak and Ahmed K. Ali	2	2
12.	Urban Gardening: From Cost Avoidance to Profit Making — Example from Ljubljana, Slovenia by Matjaž Glavan, Majda Černič Istenič, Rozalija Cvejić and Marina Pintar	2	2
13.	Comparison of the Land Uses and Sustainable Development in Small Islands: The Case of Skiathos Island, Greece by Fani Samara, Stergios Tampekis, Stavros Sakellariou, Olga Christopoulou and Athanasios Sfougaris	2	2
14.	Identifying Functionality of Peri-Urban Agricultural Systems: A Case Study by Inmaculada Marques-Perez and Baldomero Segura García del Río Relationship between Population and Agricultural Land in Amasya by Mustafa Ergen	2	2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

15.	Second Colloquium		
	Total	30	30
	During one semester will be organized two MIDTERM tests, and in the end a final test. Tests have closed questions, multiple choice, with a total of 20 questions. Each question has 2 points with a maximum of 40 points. Exceptions make some specific classes which have special specifications, number of questions – assignments might be less, but with more point, and in the total of 40 points doesn't change. The student passes the midterm if he has more than half of more correct answers. Only if the student passes the firs midterm, he can attend the second one. To determine the final grade for full time students will be applied this evaluation method: 80 points maximum from two midterms, written or oral, in essay format or filling put the written test, by which will be evaluated the final knowledge of the specific course 10 points maximum from a paper, essay, research paper, presentation 10 points maximum from their attendance in class – attendance and interactivity (participation) during the lectures. FINAL EXAM To determine the final grade for full time students will be applied this evaluation method: 80 points maximum from final exam, written or oral, in essay format or filling put the written test, by which will be evaluated the final knowledge of the specific course 10 points maximum from a paper, essay, research paper, presentation 10 points maximum from their attendance in class – attendance and interactivity (participation) during the lectures. To determine the final grade for part-time students will be applied this evaluation method: 80 points maximum from two midterms, written or oral, in essay format or filling put the written test, by which will be evaluated the final knowledge of the specific course 10 points maximum from a paper, essay, research paper, presentation 10 points maximum from their consultation with the lecturer or the assistant, at least 1 (one) time in 2 (two) weeks for each course. To determine the final grade: From 50 – 59 accumulated point take the grade 6 (six). From 60 – 69 accumulated point take the grade 7 (seven) From 70 – 79 accumulated point take the grade 8 (eight) From 80 – 89 accumulated point take the grade 9 (nine) From 90 – 100 accumulated point take the grade 10 (ten)		
	-Activity during classes		
	-Activity during lectures		
	-Activity during exercise		
	Colloquium/ midterm		

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

LITERATURE	
Mandatory	**Elective**
Stephen Roper : Entrepreneneurship a global Perspective Routledge-2013	H.S KUMAWAT (2009). Modern entrepreneur and entrepreneurship. Theory process and practice.
Vanessa Raten : Enterpreneurship, Innovation and Smart Cities, Routlidge 2017	Robin Lowe & Sue Marriot (2006). Enterprise Entrepreneurship and Innovation Concepts Contexts and Commercialization
Mohamed Samer : Urban Agriculture Published by ExLi4EvA,2016	Tracey - Urban_Agriculture_Ideas_and_Design for the new food revolution (2011)
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Theoretical instruction will be offered both in domestic and in English, but also as on-line Distance learning.	

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban Ecology**			
Course id	Semester	Course status	ECTS	Contact hours
	I	Mandatory	4	40

Required pre-laid courses	
Teaching staff	Programme Director
	Teachers
Description	The course introduces students to subject field, concepts and definitions related to urban ecology.
Learning outcomes	After successfully completing the module, the student will be able to: - Describe the urban ecological issues; - Evaluate the impacts of humans in the urban environment; - Describe the link between cities and biodiversity; - Argue about UA advantages besides production; - Identify functions and services from UA; - Evaluate factors of UA sustainability; - Plan and manage ecological agricultural systems.

Course Outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Urban ecological issues (impact of climate changes on eco-conditions of urban areas; scenery planning and use in UA; landscape analyses and UA planning as the component of holitistic useof urban area; system of greenery).	4	2
2.	Assessment of impact of humans in the urban environment (environmental conditions of urban area, changes in use of soil and its cover; city development, industrialization and ideal cities; primary production, hydrological function, nutrition circulation	4	2
3.	City biodiversity (urban biodiversity, green corridors, urban flora and fauna).	4	2
4.	Urban agriculture advantages (preservation of environment, biodiversity, natural resources and cultural historical heritage; acceptance of traditional skills and products, new working places and reduction of poverty rate in local community; UA risk)	4	2
5.	Functions and services of UA (localization of food production, sustainable cities, reduced transport expenses; recycling of organic waste; production of free eco products)	4	2
6.	Sustainability factors in urban agriculture (sustainable agriculture; preservation of agricultural soil in city and suburb areas, population reduction in urban environment; citizens organization in UA)	4	
7.	Planning and management of ecological systems	6	
	Total	30	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* ***<70% = dropout.***	5	
	Activities	15	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	-Theory *-Practical work*		
	Colloquium class	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
Unauthorized teaching material prepared by the lecturer and participants in the course - PowerPoint presentations of lectures and other teaching materials available on e-teaching	Cvejić, J. (1999.): Tipologija predela (Predeona ekologija), Beograd Katrin Bohn, Kristian Ritzmann (2015). Playing/Field Urban Agriculture: Ecological education and practice-based design. Technischen Universität Berlin
	Lj. Vujković, (2003): Pejzažana arhitektura Univerzitet u Beogradu, Šumarski fakultet
	Kreuter, M.L.: Bio vrt. Marjan tisak d.o.o. 2008
	Erasmus +, UrbanGreenTrain, http://www.urbangreentrain.eu/upimg/pdf/Module_1_final_version-compressed.pdf
	Znaor D. (1996): Ekološka poljoprivreda, Nakladni zavod, Globus, Zagreb
	Monty Waldin, (2016) Biodinamičko vrtlarstvo, Planetopledija d.o.o.
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Precision agriculture and smart food production**			
Course id	Semester	Course status	ECTS	Contact hours
	I	Mandatory	4	40
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Course goals	The course introduces students to modern information technology trends such as mobile technologies, social networks, Internet of Things, cloud computing and big data. A special emphasis is placed on Internet of Things and applications in the field of precise and smart agriculture and food production in urban areas. It enables students to understand basic concepts and definitions related to information technology and their application in urban agriculture. The course introduces students to the understanding of the challenges posed by the exponential development of information technologies and their penetration in agriculture and food production, as well as in all other aspects of life in urban areas.			
Learning outcomes	After successfully completing the module, the student will be able to: - Identify and understand modern information technology trends in the context of urban agriculture; - Understand the basic concepts of Internet Technology to identify the possibilities of application in precise urban agriculture and food production; - Understand the development and current status of precise agriculture and smart food production; - Identify and understand the application of information technologies for smart logistics; - Identify the opportunities and risks associated with the application of modern information technologies in urban agriculture; - Understand the goals, the main steps, and challenges in implementing the systems for precise agriculture and smart food production in the urban environment.			

Course outline

Week	Course content	Contact hours	
		T*	P
1.	Organization of the course, introduction to teaching environment, literature, grading.	2	
2.	Modern information technologies and trends in the context of urban agriculture. Global food production and the digital world.	2	
3.	Mobile technologies, social networks, Internet of Things, cloud computing, Big data.	2	
4.	Internet of things and applications.	2	2
5.	Precision agriculture and smart farming.	2	2
6.	Smart logistics: monitoring food products, food safety, quality control.	2	
7.	Smart processing of raw materials and food production.	2	
8.	Food-awareness solutions: information on origin, safety, quality, potential problems.	2	
9.	Precise agriculture and smart farming in urban surroundings.	2	
10.	Examples of implementation for urban agriculture. Project.	2	2
11.	Examples of implementation for urban agriculture. Project.	2	2
12.	Integration with other systems. Smart cities and urban agriculture.	2	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

13.	Social Issues and the Impact of Digitization in Urban Agriculture.	2	
14.	Future trends.	2	
15.	Project presentations.	2	2
	Total	30	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* ***<70% = dropout.***	5	
	Activities *-Theory* *-Practical work*	15	
	Mid-term exam	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
Ovidlu Vermesan, Peter Friess et al. (2016). Digitising the Industry: Internet of Things Connecting the Physical, Digital and Virtual Worlds. River Publishers.	Po izboru predavača.
Joseph Valacich, Christop Schneider (2017). Information Systems Today: Managing in the Digital World. Pearson.	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

2.8 Syllabi: second semester for UNSA, UNMO and UDG

Study program		Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)	
		Programme name	Urban agriculture	
COURSE				
Course name	**Sustainable agriculture**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Mandatory	3	30
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	The course introduces students to the origins, major concepts, and current issues of sustainability in agriculture. It enables students to understand difficulty of plants production in terms of sustainable use of environmental resources (soil, water). The course defines and enables students to understand and explain to others the characteristics of our current agricultural system, the many components of sustainable agriculture and how they relate to each other and ways that our society is moving or could move toward a sustainable agricultural system.			
Learning outcomes	Upon completion of this course, student should be able to: - Identify and adapted definition and major concept of sustainable agriculture, - Understand the difficulty of plant production in terms of sustainable use of environmental resources. -Analyze interventions in agriculture, which undoubtedly affect the environment, and make them sustainable, and also economically, socially and ethically acceptable, - Describe and interpret contemporary trends in sustainable cultivation of plants, particularly Integrated, Biological and Organic methods, - Understand how the changes to sustainable management affect economic policy and rural development, - Monitor and implement the most important current FAO and EU agricultural programs and programs of scientific research in EU agriculture. -Identify and assess specific problems within a holistic approach and apply and recommend guidelines for sustainable development in policy practice at local, national and global levels.			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to course organization, teaching conditions, literature, grading. Defining Sustainable Agriculture	2	
2.	Traditional Agriculture and the Green Revolution, Urbanization, the Global Food Crisis, UA in the Developing Word	2	
3.	Urbanization, Global Food Crisis, UA in Developing World	2	
4.	The concept of permaculture as a way of looking at agriculture and our world in general.	2	
5.	Elements of Sustainable Agriculture - soil	1	1
6.	Elements of Sustainable Agriculture - water	1	1
7.	Elements of Sustainable Agriculture - biodiversity	1	1
8.	Soil and Water Conservation and Management	1	1

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

9.	Sustainable Soil Fertility & Irrigation Management	1	1
10.	Agroecological Principles for Plant Health & Pest Management	1	1
11.	Energy and Agriculture	1	1
12.	Access and Food Justice	1	1
13.	The importance of sustainable agriculture for economic and social development of certain areas in BiH	2	
14.	Field visit	2	
15.	Field visit		2
	Total	20	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works (homework)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Greenfacts (Hrsg.) (2008): Agriculture and Development – A summary of the IAASTD.	Based on teacher suggestions
Čengić-Džomba, S., Drkenda, P., Đikić, M., Gadžo, D., Latinović, N., Mirecki, N., Mirecki, S. (2014): Organic agriculture. Univerzity of Monte Negro, Biotehnical faculty Podgorica, ISBN 978-9940-606-07-7.	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban fruit and wine growing**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Mandatory	6	60
Required pre-laid courses				

Teaching staff	Programme Director	
	Teachers	
Description	Growth and development of different types of fruit and their cultivation in urban environment. Fruit and wine growing systems adaptations to urban agriculture; Selection of fruit varieties and innovations in UA cultivation system.	
Learning outcomes	Students attain knowledge and understanding: on different fruit plants and fruit growing terminology, on basic processes of fruit plants growth and development. Students know fruit plants and are able to distinguish between fruit plants. Students are qualified to use basic principles of fruit growing (pruning, nutrition). The level of knowledge obtained at this course is the basis for further understanding of different fruit plants technologies and their use in Urban farming. Understanding the importance and implementation of fruit growing production in the conditions of Urban farming. Understanding the requirements of specific fruit plants. Transferable skills: The level of knowledge obtained at this course provides a critical Assessment of possibilities for successful urban fruit/wine production. Qualification for the transfer of knowledge to others.	

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Course introduction. General course introduction, course programme, practical experiences, workshops, field visits, teaching material final exam.	2	
2.	Introduction to sustainable fruit crop production. The importance of fruit growing. Fruit growing region (climate, soil, position). Land cultivation for orchard planting (field leveling, arrangement of paths, soil analyses, amendment of the soil and green fertilization), setting up the fence.	4	
3.	Preparation of planting scheme (pollination relations), setting up the support, planting, hail nets, fertirrigation system.	4	2
4.	Training systems and planting systems of different fruit species according to cultivar/rootstock combination. Work norms of working phases in orchards with different systems and structures.	4	2
5.	Technological measures (pruning, nutrition, foliar fertilization, fruit thinning (chemical and hand), irrigation, maintenance of cultivated fallow and herbicide zone, timing of plant protections against pests and diseases) in production orchards.	4	2
6.	Assessment of yield, planning of harvest time and harvest. Basic demands for fruit quality, storage, sorting, package, preparation of fruit for the market. Determination of harvest time with different tests and instruments for harvest.	4	2
7.	Fruit crop production in the urban environment (including grape). Soilless systems for greenhouse and rooftop fruit production	2	1
8.	Nutrient management in urban fruit crops production (including grape). Dynamic	4	1

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

	nutrient management guided by optical sensors (K, P, Mg, S, Ca, and microelement nutrition).		
9./10.	Water management in urban fruit crop production (including grape). Plant requirements. Sensors and Decision support systems for dynamic water management in horticulture.	2	1
11.	Indoor plant cultivation systems (greenhouse systems and typologies). Artificial lighting and LED technology for fruit crops (including grape), hydroponic system, vertical system, cultivation on the table etc..	2	1
12.	Practical workshop: measuring plant physiological response to environmental stresses. At the experimental greenhouse facilities of DISTAL, measurements with leaf porometer and pressure chamber on salt stressed vegetable crops. Definition of light intensity and spectral composition.		2
13.	Growth and development of wine (table and vine) in urban agriculture, the possibilities, adaptations and potential of its cultivation	4	2
14.	Field visit		4
15.	Test	2	
	Total	40	20
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works (homeworks)	20	
	Final exam	45	

LITERATURE	
Obligatory	**Elective**
Čivić H., Muminović Š., Karić L., Drkenda P.,Čorbo S., Avdić J., Škaljić S., (2017): Osnove biljne proizvodnje. Grafičar Promet d.o.o Sarajevo. Keserovic, Z. (2008). Proizvodnja voća i grožđa na malim površinama. Mirecki N., Čengić-Džomba S., Drkenda P., Đikić M., Gadžo D., Latinović N., Mirecki S. (2014): Organska proizvodnja. Univerzitet Crne Gore, Biotehnički fakultet Podgorica.	Based on teacher suggestions
Wratten, S., Sandhu, H., Cullen, R., Costanza, R. (2013). Ecosystem Services in Agricultural and Urban Landscapes McGranahan, G., & Satterthwaite, D. (2003). Urban centers: An assessment of sustainability. Annual Review of Environment and Resources, 28(1), pp. 243-274.	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban vegetable and field crop production**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Mandatory	6	60
Required pre-laid courses				

Teaching staff	Programme Director	
	Teachers	

Description	The course introduces students to basic concepts and definitions related to crop and vegetable production in urban agriculture, historical development and significance. It enables students to understand trends related to food production and consumption in urban environments of today, models of urban agriculture, advantages and disadvantages of different models of crop and vegetables production in urban areas. The course introduces students to standard and specific forms / models of production of vegetable-vegetable crops in urban agriculture, with special emphasis on modern and classical production systems and their models and types, and theoretically and practically enables students to plan and realize production. The course introduces students to the application of modern ICT technologies with a special focus on innovation, and trains students for their application in production.
Learning outcomes	Upon successfully completing the module, the student will be able to: - Identify a customized definition of urban agriculture, depending on the purpose and context; - Understand the development and current status of crop and vegetable urban agriculture production in Europe, America, Africa and Asia; - Understand the development of different types of urban agriculture depending on the level of development, goal and context; - Understand historical and contemporary models and types of vegetable production in urban agriculture, and their role and significance. - Identify classical and modern production systems; - Use tools and methods for crop and vegetable production in urban agriculture; - Understand the concepts, types and goals of specialization and diversification of crop and vegetable production in urban agriculture, and understand their advantages and disadvantages; - Introduce and use ICT tools and methods for producing vegetables in urban agriculture and automation of production; - Get to know the most modern and most successful business examples based on innovation; - Understand specific factors that affect crop and vegetable food safety and quality of food produced in urban agriculture.

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to course organization, teaching conditions, literature, grading.	2	
2.	Definition of urban agriculture depending on the goal and the context. Historical development, typology and current status of urban agriculture in Europe, America, Africa, Asia and WB with a reference to the First and Second World War and siege of Sarajevo 1992-1995. Technological development with reference to the 4th industrial revolution. The ecological, economic, social and health significance and role of urban agriculture. Green economy and contemporary green cities concepts.	2	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

3.	The role and importance of crop and vegetable production in urban agriculture, trends and habits. Standard and specific forms of crop and vegetable production in urban agriculture. Types, roles and importance of the form with a focus on the level of development, goal and context.	2	
4.	Classic crop and vegetable production systems in urban agriculture, types, roles/goals and significance. Hydroponics crop and vegetable production systems in urban agriculture, types and significance.	2	
5.	Production on organic and synthetic substrates, types and significance. Production techniques and technology: -Production in pots, containers and bags. -Production in other modular, mobile unites.	2	3
6.	Vertical production systems, types, roles and significance. Production techniques and technology: -Vertical containers. -Vertical NFT systems.	2	3
7.	Indoor food production systems, types, roles and significance. Production techniques and technology: -Vertical gardens. -Micro-gardens.	2	3
8.	Diversification in crop and vegetable production in urban agriculture, types and significance: -Eco-service. -Social entrepreneurship. -Tourism and education. Specialization in urban agriculture, types and significance: -Microgreens, sprouts, decorative salads, edible flowers, etc.	2	3
9.	ICT technologies in crop and vegetable production in urban agriculture and automation of production: -LED and Internet of Things (IoT) technology. -Control and management of microclimate. -Control and management of production process. -Use of social networks and online databases. -Case study: Plant Factories Japan.	2	
10.	Innovations in urban agriculture: -Startup companies, case studies (FreightFarms, Click & Grow, etc.). -Crowd fund, case studies (Kickstarter, Indiegogo, GoFundMe). Urban climate change, crop and vegetable food safety and quality.	2	
11.	Selected field crop in urban area. The role of field crop for urban area (market requirements, crop rotation, processing etc.)	2	2
12.	The use of field crops in urban agriculture design and landscape architecture	2	2
13.	The species of field crops suitable for producing in urban areas; nutrient management in urban field crops production; water management in urban field crops production;	2	2
14.	Technology production, harvest, storage and used field crops	4	
15.	Field visit		8
	Tests	2	2
	Total	30	30
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works (homeworks)	20	
	Final exam	45	
LITERATURE			
Mandatory		**Elective**	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Elvedin – Edo Hanić, 2000. Značaj supstrata, kontejnera I hormona u rasadničarskoj proizvodnji., Univerzitet Džemal Bijedić Mostar I	
Elvedin – Edo Hanić, 2010. Proizvodnja u hidroponici I organsko-mineralnim supstratima. Univerzitet Džemal Bijedić Mostar.	
Toyoki Kozai, Genhua Niu, Michiko Takagaki, 2016. Plant Factory An Indoor Vertical Farming System for Efficient Quality Food Production. Elsevier Inc.	
Gadžo, D., M. Đikić, Z. Jovović, A. Mijić (2017): Alternativni ratarski usjevi. URL: http:/www.unsa.ba ISBN 978-9958-597-58-9 Gadžo. D., M. Đikić, A.Mijić, 2011: Industrijsko bilje. Univerzitetski udžbenik. Izdavač Poljoprivredno-prehrambeni fakultet Sarajevo. ISBN 978-9958-597-21-3	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban farming, nutrition and irrigation**

Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	

Required pre-laid courses	
Teaching staff	Programme Director
	Teachers
Description	The course provides the basics in theoretical and practical terms in the field of plant nutrition and irrigation in urban agriculture cultivation conditions.
Learning outcomes	After successfully finished subject activities, student will be able to: - Self-diagnose a possible lack of certain nutrients - Implement the necessary measures for improving soil fertility and plant nutrition in urban conditions - Apply appropriate methods of irrigation and drainage in urban conditions

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Basic physical and chemical properties of the mineral and organic part of the soil, adsorption properties of soil	2	
2.	The absorption of nutrients and effect reactions middle of their translocation in plants	1	1
3.	The absorption of ions from the soil.	1	1
4.	Foliar plant fertillization	2	
5.	Adoption of nutrients depending on the plant growth phases	2	
6.	Soil fertility and the impact of micro and macro nutrients to it	2	
7.	Methods of fertility correction, modes of mineral and organic fertilizers	2	
8.	1st semestral test	1	
9.	Introduction to land development and irrigation in the area of BiH	1	
10.	Fundamentals of hydrology and water balance of the soil	1	
11.	Simple hydraulic calculation and hydrometric measurements	2	1
12.	Types, forms, factors and forecast erosion; soil conservation measures: agro-technical, biological, technical	1	1
13.I	The need for drainage, basic parts of the drainage system, drainage ways, maintenance of the drainage system)	2	1
14.	The needs for irrigation, water quality, balancing the needs of water for irrigation, irrigation and watering norm, the basic parts of the irrigation system, irrigation methods	2	
15.	Irrigation System Maintenance	1	
16.	2nd semestral test	2	
	Total	25	5
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% =dropout.*	5	
	Activates *-Theory* *-Practical work*	10	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	Seminar	15	
	1st semestral test	35	
	2nd semestral test	35	0
	Final exam*		

LITERATURE	
Mandatory	**Elective**
Hanić E. Murtić S. 2008. Praktikum iz Agrohemije i Ishrane biljak Vukadinović, V., Lončarić, Z. 1998. Ishrana bilja. Osijek	Hanić, E. 2008 Proizvodnja u Hidroponima i organskim supstratima.Mostar
Vlahinić, M., Muftić, H. (1972): Poljoprivredne melioracije i uređenje zemljišta, I dio, Univerzitet u Sarajevu.(odabrana poglavlja)	Žurovec, J. (2008): Poljoprivredne melioracije i uređenje zemljišta, Interna skripta, Poljoprivredno-prehrambeni fakultet, Sarajevo. (odabrana poglavlja).
CONSULTATIONS	**Day/hours:** **Mail:**
Note:	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban farming plant protection**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	Recognizing the differences between healthy and damaged plants, the causers of which are insects, fungi, bacteria, viruses etc. Description and life cycle of harmful organisms, which occur in many cultivated plants. Presentation of different types of damage caused by harmful organisms and control measures. Qualification for selection of the optimal plant protection measures and use of proper pesticides against the target pests/diseases.			
Learning outcomes	Students get knowledge about how pathogens affect the physiological functions of plants and, indirectly, the expression of symptoms on cultivated plants. Learn about the genetic bases plant diseases, how pathogens infect plants, how they are defending and the impact of environmental factors on the pathogenesis. Learning about the major groups of plant pathogens, their symptomatology, morphology, biology, ecology, with the aim of training in their identification due to optimal protective measures in terms of good plant protection practice. Students recognize specific injuries and symptoms on the most important groups of cultivated plants. Students are familiar with characteristics and modes of action of individual groups of pesticides, and based on this knowledge they can choose suitable synthetic pesticides against pest/diseases in optimal time. On the basis of plants' survey, the students can determine their health status. The students are qualified for professional treatment and use of pesticides. They earn basic knowledge from the field of plant protection for managing their own food production and for continuation of the study.			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Course introduction. General course introduction, course programme, practical experiences, workshops, field visits, teaching material final exam.	1	
2.	Introduction - scientific names, terms, diagnosing problems.	1	
3.	Control Techniques - natural & chemical.	2	
4.	Chemicals - characteristics.	2	2
5./6./7.	Identifying Diseases - symptoms, fungi and viruses, and other pathogens.	4	2
8.	Disease Control - life cycle of fungi.	2	
9.	Insect Classification and biology.	2	
10./11.	Insect Control - how to control pests.	2	2
12.	Weed Identification and chemical control.	2	
13.	Non-chemical Weed Control	1	
14.	Field visit		3
15.	Test	1	1
	Total	20	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points*	5	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	<70% = dropout.		
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works (homeworks)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Numić, R. (1996): Fitopatologija specijalni dio IP „Svjetlost Sarajevo , odabrana poglavlja (20 str.)	Based on teacher suggestions
Numić, R. (2000): Fitofarmacija, Univerzitetska knjiga, odabrana poglavlja (10 str.)	
Delalić, Z. (2004): Zaštita biljaka, Univerzitetska knjiga Bihać, odabrana poglavlja (20 str.)	
Festić, H. (1996): Poljoprivredna entomologija. IP „Svjetlost“ Sarajevo, odabrana poglavlja (40 str)	
Šarić, T. (1991): Korovi i njihovo uništavanje herbicidima.	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Study program	Programme type		Master degree (Second cycle degree/Two year Master - 120 ECTS)	
	Programme name		Urban agriculture	
COURSE				
Course name	**Use and cultivation of ornamental plants**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30
Required pre-laid courses				
Teaching staff	Programme Drector			
	Teachers			
Description	The purpose of the course is to familiarize students with the functions of green surfaces, from the ambience to the aesthetic function, the historical development of garden art, the flower decoration of ornamental plants and its application in the interior and exterior. In addition, students should acquire basic knowledge of landscape and space as well as the basic principles of raising green areas of different uses.			
Learning outcomes	By adopting the basic knowledge of syllabus, the student has the opportunity to master the most important knowledge of floristry. As the types of ornamental plants bear the functions of all green areas, the student is able to master the basic knowledge of the possibilities of using ornamental plants in accordance with the Florentine Classification. Student is also trained for independent research and study in order to realize the possibilities for organizing the basic processes of production and maintenance of ornamental plants. In addition, this syllabus is the basis for a more successful mastering of related syllabus, which is the further upgrading and acquisition of knowledge from the flourishing trade and landscape architecture.			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction. The function of green areas, the application of flower cultures in exterior and interior.	2	
2.	Historical development of garden arts	2	
3.	Ecological factors (light, heat and water)	2	
4.	Propagation of ornamental plants.	1	1
5.	Use of ornamental plants.	1	1
6.	Classification of ornamental plants.	2	
7.	Classification of ornamental plants.	1	1
8.	1st semster test	1	
8.	Visual-aesthetic elements: elements of fine art	1	
9.	Architectural elements	2	
10.	Plant elements (groups of the same name and mixed groups)	1	1
11.	Plant elements (flower beds, border, etc.)	1	1
12.I	Elements with water in the garden	2	
13.	The system of green - urban, suburban and rural greenery	2	
14.	Design and maintenance of green areas	2	
15.	2nd semester test	2	
	Total	25	5
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points <70% =dropout.*	5	
	Activates	5	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	-Theory *-Practical work*		
	Colloquium class	25	
	Written works(homework's)	20	
	Final exam*		

LITERATURE	
Mandatory	**Elective**
Temim, E. (2008) Cvatuće drveće i grmlje, Agromediteranski fakultet Univerzitet „Džemal Bijedić" u Mostaru – skriptaTemim, E. (2006) Jednogodišnje i dvogodišnje cvijeće, Agromediteranski fakultet Univerzitet „Džemal Bijedić" u Mostaru – skripta Temim, E. (2007) , Trajnice, Agromediteranski fakultet Univerzitet „Džemal Bijedić" u Mostaru – skripta Temim, E., Dorbić, B. (2017) Sobno bilje, Univerzitet „Džemal Bijedić" u Mostaru Agromediteranski fakultet, „Green" Mostar Temim, E. (2017) Historija vrtne umjetnosti klasični vrtovi, Fram Ziral, Mostar Vujković Lj. (2003) Pejsažna arhitektura planiranje i projektovanje, Beograd	Temim, E. (2009.) Bosnaskohercegovačka cvjetna avlija, IC štamparija Mostar Brookes, J. 2002. Dizajn vrta. «Znanje», Zagreb Vujković, Lj. Vujičić, D. Nećak, M. (2003) Tehnika pejsažnog projektovanja. Beograd Kluckert, E., 2000.: Giardini d` Europa. Köln
CONSULTATIONS	**Day/hours:** **Mail:**
*** Note:**	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Aromatic and medicinal plants**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30
Required pre-laid courses				
Teaching staff	Programme director			
	Teachers			
Description	The course introduces students: with the concept of sustainable management and utilization of medicinal and aromatic plants resources in urban environment; growing systems of MAP-s adaptations to urban agriculture; identification of morphological and biological characteristics of selected MAP. Furthermore, the course provides basic knowledge and skills related to production technology, drying, and storing MAP. Students will be introduced to the chemical composition of selected plants.			
Learning outcomes	Upon completion of this course, student should be able to: - classifying and identifying aromatic and medicinal plants for UA - understanding the production technology and effectively applying current methodology for problem solving -knowing the procedures of post-harvest processing and impact of drying and storage on quality of MAP - learning the most important active components of selected MAP - identifying the useful application of selected plants in nutrition, pharmacology, cosmetic etc…			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to the module, teaching methods, students' obligations during the course, teaching material, final exam	2	
2.	The importance of cultivation of MAP-s, the role of biodiversity Classification of medicinal and aromatic plants according to ecological conditions of production and use	2	
3.	Identification of MAP-s, basic criteria for identification	1	1
4.	Identification of MAP-s, basic criteria for identification (continued from week III)	1	1
5.	The use of MAP in urban agriculture design and landscape architecture	1	1
6.	Production of MAP: field or indoor plant cultivation system	1	1
7.	Species of medicinal plants suitable for producing in urban areas; nutrient management in urban MAPs production; water management in urban MAPs production;	1	1
8.	Species of spicy plants suitable for producing in urban areas; nutrient management in urban MAPs production; water management in urban MAPs production;	1	1
9.	Practical workshop: Designing and presenting a research on MAPs - preparation of planting scheme selected group of MAP in field conditions (micro gardens, vertical gardens), including all technological measures during production		3
10.	Indoor plant cultivation system: greenhouse, pots, containers, bags; vertical containers. The selection of plants for indoor production	1	1
11.	Indoor plant cultivation system: greenhouse, pots, containers, bags; vertical containers. The selection of plants for indoor production (continued from week	1	1

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	X)		
12.	Assessment of yield, planning of harvest time and harvest	1	
13.	Basic demands for MAP-s quality, preparation for drying or other ways of conservation and processing	1	
14.	Field visit		4
15.	Test	1	
Total		15	15
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = dropout.*	5	
	Activates *-Theory* *-Practical work*	25	
	Colloquium class		
	Practical exercises	25	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Gadžo, D., M. Đikić, Z. Jovović, A. Mijić (2017): Alternativni ratarski usjevi. URL: http:/www.unsa.ba ISBN 978-9958-597-58-9 Šilješ, I., Grozdanić, Đ., Grgesina, I. (1992.): Poznavanje, uzgoj i prerada ljekovitog bilja. Školska knjiga. Zagreb. Oztekin, S, Martinov, M. 2007. Medicinal and Aromatic Crops, Harvesting, Drying and Processing, Haworth Food and Agricultural Products Press, New York ISBN-13: 978-1560229759	Marshall Elaine, 2011: Health and wealth from medicinal aromatic plants. http://www.fao.org/3/a-i2473e.pdf Akos Mathe Medicinal and aromatic plants of the world. DOI: https://doi.org/10.1007/978-94-017-9810-5 Bogers, Robert, J., L. E. Craker, D. Lange, 2006: Medicinal and aromatic plants. ISBN 978-1-4020-5447-1.
CONSULTATIONS	**Day/Hours:** **Mail:**
* Note:	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Beekeeping**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	The purpose of the module is to encourage participants in the promotion and improvement of economic competencies for achieving a better position in the value chain of bee products, through: introduction to the basic terminology and concepts in beekeeping, as well as the systematics, morphology, biology and the role of the bees in the ecosystem; acquisition of practical knowledge and skills about beekeeping technology (breeding bees) to achieve high yields of honey and other bee products, application of modern beekeeping technology and maximum utilization of bee pastures, along with necessary measures to fight bee brood and adult bees diseases; entrepreneurial skills and economic skills development for participation in the market of bee products; improving relations between beekeepers and other agricultural sectors (fruit growing, farming)that can increase yields for both; training for development of new products based on honey.			
Learning outcomes	After successfully completing the module, student will be able to: 1. Individually manage smaller number of colonies (hives) a. recognizes the anatomy, physiology and the development of bee colonies; b. actively uses modern beekeeping techniques; 2. Demonstrates the ability for independent appearance on the market of bee products a. understands the economic environment of the bee products; b. creates the business plan for small number of bee colonies, calculates the cost of bee products, preparing products for market; 3. Uses the basic technology of production, packing, storage and transport of bee products a. analyze and interpret the results of the basic physical and chemical analyzes of honey; 4. Recognize importance of mutual cooperation with other branches of agriculture a. explains the relationship with other agricultural production (fruit, crop production) and the implications of beekeeping production; b. defines appropriate ways to protect their production.			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to course organization, teaching conditions, literature, grading	2	
2.	Sustainable Urban Beekeeping	2	
3.	Introduction to anatomy, physiology and development of bee colony	2	
4.	Guidelines on safety at the apiary; the formation of the apiary (exposure, etc.)		2
5.	Introduction to types of hives, basic equipment and supplies		2
6.	Monthly work in the apiary		2
7.	Feeding Bees		2
8.	Diseases, Medication, Colony Health	2	
9.	Modern techniques of beekeeping, transporting, getting the final product (extracting honey)	2	
10.	Other products from the hive - pollen and wax	2	
11.	Other products from the hive - Royal Jelly, propolis and bee venom	2	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

12.	Beekeeping production economics	2	
13.	Market and marketing in beekeeping	2	
14.	Mutual cooperation with other branches of agriculture	2	
15.	Visit urban apiary		2
	Total	20	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works (homeworks)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Grupa autora Poljoprivredno-prehrambenog fakulteta (2015): Skripta predavanja i vježbi pripremljena za modul „Pčelarstvo“, PPF, UNSA, Sarajevo	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban Agriculture

COURSE

Course name	**Biogenic waste management**			
Course id	Semester	Course status	ECTS	Contact hours
	II	Elective	3	30
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	The subject teaches: how to include biogenic wastes that accumulate where circulation is impeded (larger settlements, large livestock farms, and other agricultural and forest healthy and safe and also economical system of recycling; how to recover and transform them into useful products for agriculture, horticulture and general (e.g. re-cultivation of degraded land, amending of soils...). Familiarity with biological and technical principles of the recovery of biogenic waste materials into useful material - heat, biogas, organic fertilizer (compost), or soil improver, growing medium.			
Learning outcomes	The student understands the biological and engineering principles of biogenic waste materials recovery into useful substances, biogas, organic fertilizer, compost or soil improver, and growing media. Realizes both thebenefits and potential dangers in their use. Student comprehended a principle of holistic management of biogenic waste, which is the basis for the design and management of environmental and sustainable policies. Knows how to analyse the quality of the products and how to design new commercial products. Is able to lead an industrial composting or biogas plant. Get the essential functional skills that are needed for environmental management of agricultural or horticultural holdings. Acquire the skills necessary for a sustainablefarm management, composting or biogas plant,skills of critical assessment of environmentallysound use of biogenic waste and products made from them and also to design new products (compost, substrates...).			

Course Outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Organization of the course, introduction to teaching environment, literature, grading.	2	
2.	Types of biogenic wastes; routes of their formation, plant and livestock residues on the farm; recycling of biogenic wastes in the urban areas, the quantity of biogenic waste, physical and chemical properties.	2	
3.	Food scraps, sewage sludge, solid and liquid manure, the contents of septic tanks, remains after fermentation, etc.	2	
4.	Anaerobic digestion, biogas production and the use of residue after fermentation.	2	
5.	Composting: biological basis, technological requirements, the dynamics of degradation, the existing technological processes, methods for determining the maturity of compost, quality parameters for the use of compost in agriculture and horticulture.	2	
6./7.	Physical, chemical and biological methods for the assessment of the fertilizing value of the compost, residue after fermentation.	2	2
8.	Briquetting (pelleting) and the use of biogenic waste and produced organic fertilizers	2	
9./10.	Compost and other materials as components of growing medium (compost as a peat substitute). Growing media (artificially prepared garden soil, substrate-	2	2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

	raising pot plants...). Analytical procedures for the assessment of growing media.		
11.	Material - energy balance of individual manufacturing processes.	2	2
12.	Examples of integrated design technologies for reducing material - energy losses.		2
13.	Standards and legislation. Basic economic indicators of the processing and use of biogenic waste.	2	
14./15.	Project presentations	2	2
	Total	20	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* ***<70% = dropout.***	5	
	Activtes *-Theory* *-Practical work*	15	
	Seminar paper	30	
	Homework and essays	10	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
MIHELIČ, Rok, ANDOLJŠEK, Lilijana, LESKOŠEK, Mirko, LOBNIK, Franc. Uporaba biogenih odpadkov v kmetijstvu: stanje v Sloveniji in perspektive. Gospod. odpad., maj 2001, letn. 10, št. 38, str. 8-14, graf. prikazi. [COBISS.SI-ID 3055993] PETERSEN, Søren O., MIHELIČ, Rok. Recycling of livestock manure in whole-farm perspective. Livest. sci.. [Print ed.], 2007, vol. 112, no. 3, str. 180-191. MIHELIČ, Rok. Možnosti uporabe fermentacijskih ostankov in kompostov glede na njihovo kakovost. V: KOMAC, Milica (ur.). Strokovno posvetovanje Gospodarjenje z biološko razgradljivimi odpadki, Ljubljana, 03. in 04. februarja 2010. Ljubljana: Most do znanja, družba za izobraževanje, 2010, str. 1-8 Lakota M., Sunko R., Hotwagner M., Grnjak L., Stajnko D., Vindiš P., Rakun J., Berk P (2013): Študija organskih odpadkov. Univerza v Mariboru, Fakulteta za kmetijstvo in biosistemske vede, Katedra za Biosistemsko inženirstvo Emilija Ivković (2012) GOSPODARENJE-OTPADOM_SKRIPTA. Slavonski Brod.	Define teacher
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Application of Geographic Information System in Urban agriculture**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30

Required pre-laid courses	
Teaching staff	Programme Director
	Teachers
Description	This course will introduce students to the basic concepts of Geographic Information Systems. The course provides basic knowledge (theoretical and practical) about use and application of GIS technology in agriculture/urban agriculture, ecology and territorial analysis, the formation of GIS, processing and working with data, and their application in sustainable development planning of the local community and agriculture/urban agriculture. Through practical exercise, this course will help in understanding and developing the basic techniques and skills in the design and use of GIS, application of agro-ecological zoning, multifunctional role of space etc.
Learning outcomes	The course will help to understand the basic concepts and problems, and to understand/develop basic techniques and skills in the design and use of GIS in agriculture/urban agriculture.

Course outline

Week No:	Course unit	Contact hours T*	Contact hours P
1.	Introduction: Definition. GIS components. GIS functionality. Data and databases. GIS software and hardware support. Advantages of GIS technology.	2	
2.	Types of data. The collection, entry and display geospatial data. Organization of data in GIS.	1	1
3.	Remote sensing. Land cover and land use.	2	
4.	Cadastre data. Cadastre of green areas. Spatial planning.	2	
5.	Land cover/land use analysis. Multifunctional role of land.	1	1
6.	Working with vector data.		2
7.	Working with raster data.		2
8.	Field work.	2	2
9.	Test.	1	
10.	Concept of agricultural planning and GIS.	2	
11.	Land suitability for agriculture/urban agriculture.	2	
12.	Data modelling.		2
13.	Presentation of student project.	1	
14.	Pre-exam (Colloquium).	2	
15.	Field visit (Cadastre of green areas).		2
	Total	18	12
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	Student project	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Tutić D., Vučetić N., Lapaine M., (2002): Uvod u GIS, Geodetski fakultet, Sveučilište u Zagrebu.	M. Ljuša, (2007): Tlo kao faktor agro-ekološkog zoniranja na području općine Stolac, magistarski rad.
	R. Biancalani, T. Predić, M. Leko, E. Bukalo, M. Ljuša, (2004): Tip iskorištavanja zemljišta, FAO, Sarajevo.
	FAO, (1996): Guidelines: Agro-ecological zoning. FAO Soils Bulletin no. 73, Rome.
	Ljuša M., Čustović H., Cero M., (2016): Land capability study and map in function of land protection, spatial planning and agro-ecological zoning, Works of the Faculty of Forestry University of Sarajevo, Volume 1, Issue 1.
	Weerakoon, Kgpk. (2013). GIS assisted suitability analysis for urban agriculture; as a strategy for improving green spaces in Colombo urban area. International Journal of Remote Sensing & Geoscience (IJRSG). 2.
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Plant propagation in Urban Agriculture**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	Propagation of horticultural plants by seeds-seed development and viability, seed dormancy, see health, seed testing and certification, growing seedlings in indoor containers, seed bed preparation, seedling transplanting-advantages and disadvantages of seed propagation, Vegetative propagation- organs used in propagation-natural and artificial vegetative propagation; methods-cutting, layering, grafting and budding, advantages and disadvantages of vegetative propagation; micropropagation.			
Learning outcomes	Knowledge gained related to recognition of GMO production, production of own seeds and seedlings; Enabling to produce vegettaive and generative material in different types of plant production, micropagation techniques			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to course organization, teaching conditions, literature, grading.	2	
2.	Plant propagation-introduction, Biology of propagation, Propagation facilities, Development of seed , Seed production and handling	2	
3.	Principles of propagation from seed, Techniques of propagation by seed, Principles of propagation by cuttings, Techniques of propagation by cuttings, Principles of grafting and budding	1	1
4.	Principles of grafting and budding, Techniques of grafting,	1	1
5.	Techniques of budding, Propagation by layering		2
6.	Propagation by specialized stems and roots, Principles and practices of clonal propagation,	1	1
7.	Principles to tissue culture and micropropagation.	2	
8.	Introduction, importance of vegetable production and category of planting material	2	
9.	Production facilities (preparation of facilities, facilities with heating..)	2	
10.	Planning the necessary area for the production of seedlings according to production requirements Substrate for the production of seedlings, Planting seedlings,	2	
11.	Conditions for the production of seedlings, Care measures in seedling production	2	
12.	Production of vegetable seedlings in protected and open spaces	2	
13.	Production of tobacco seedlings in protected and open spaces	2	
14.	Production of onion and potato plant material	2	
15.	Field visit		2
	Total	23	7
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points*	5	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	<70% = dropout.		
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works (homeworks)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Fikreta Behmen, Mersija Delić (2015): Rasadnička proizvodnja voćaka i vinove loze. Print Delivery and Service, Ilidža	
VUKAŠINOVIĆ, Smiljka, KARIĆ, Lutvija, ŽNIDARČIČ, Dragan. Osnovi povrtlarstva. Sarajevo: Poljoprivredni fakultet, 2005. (st. 6-13; 26-39; 62-74)	
Maksimović, S. Petar. Proizvodnja povrća u zaštićenom prostoru, 2011. (st. 64-95)	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Dynamic input and climate management in urban agriculture systems using informatics tools**

Course code	Semester	Course status	ECTS	Contact hours
	II	Elective	3	30

Required pre-laid courses	

Teaching staff	Programme Director	
	Teachers	

Description	The course introduces students to modern IT trends such as sensors for measurement of atmospheric, air quality and agricultural land parameters, as well as the smart greenhouses, the networks, microcontrollers and web and mobile applications in area of agricultural science. It enables students to understand basic concepts and definitions related to modern IT and their application in urban agriculture. The course introduces students to the understanding of the challenges posed by the exponential development of IT and their influence to monitoring complete agricultural process on the land.
Learning outcomes	After successfully completing the module, the student will be able to: - Have the knowledge regarding different sensors and their agricultural application; - Understand the basic concepts of smart agricultural systems and their networks; - Understand the basic working principles of microcontrollers and development of web and mobile applications in field of the agriculture; - Introduce with future trends including drone applications;

Course Outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Organization of the course, introduction to teaching environment, literature, grading.	2	
2.	Introduction in measurement techniques.	2	
3.	Sensors for measurements of atmospheric parameters.	2	1
4.	Sensors for measurements of air quality.	2	1
5.	Sensors for measurements of agricultural land.	2	1
6.	Development of smart agricultural systems.	2	
7.	Smart greenhouses.	2	
8.	Networks for smart agricultural systems.	2	1
9.	Smart microcontrollers for smart agricultural systems.	2	1
10.	Web and mobile application for smart agricultural systems.	2	1
11.	Examples of implementation for smart agricultural systems. Project.	2	1
12.	Examples of implementation for smart agricultural systems. Project.	2	1
13.	Improvement of smart agricultural systems with drone applications.	2	
14.	Future trends.	2	
15.	Project presentations.	2	2
	Total	30	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* ***<70% = dropout.***	5	
	Activities	15	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	-Theory *-Practical work*		
	Colloquium class	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE

Mandatory	**Elective**
ISO 13320:2009 (2009). Particle size analysis – Laser diffraction methods. International Organization for Standardization, Geneva, Switzerland.	Masic, A.; Bibic, D.; Pikula, B.; Dzaferovic-Masic, E. & Musemic, R. (2018). Experimental Study of Temperature Inversions Above Urban Area Using Unmanned Aerial Vehicle, Thermal Science (2018) Masic, A.; Pikula, B.; Bibic, D.; Musemic, R. & Halac, A. (2018). Calibration and Assessment of Low-cost Dust sensors, Proceedings of the 29th DAAAM International Symposium, B. Katalinic (Ed.), Published by DAAAM International, ISSN 1726-9679, Vienna, Austria Masic, A.; Bibic, Dz.; Pikula, B.; Razic, F.: New Approach of Measuring Toxic Gases Concentrations: Principle of Operation; (2018) Proceedings of the 29th DAAAM International Symposium pp.xxx-xxx, B. Katalinic (Ed.), Published by DAAAM International, ISBN 978-3-902734-11-2, ISSN 1726-9679, Vienna, Austria, DOI: 10.2507/29th.daaam.proceedings Masic, A.; Pikula, B. & Bibic, Dz. (2017). Mobile Measurements of Particulate Matter Concentrations in Urban Area, Proceedings of the 28th DAAAM International Symposium, pp.0452-0456, B. Katalinic (Ed.), Published by DAAAM International, ISBN 978-3-902734-11-2, ISSN 1726-9679, Vienna, Austria, DOI: 10.2507/28th.daaam.proceedings.063
Jayaratne, R.; Liu, X.; Thai, P.; Dunbabin, M. & Morawska, L. (2018). The Influence of Humidity on the Performance of a Low-cost Air Particle Mass Sensor and the Effect of Atmospheric Fog. Atmospheric Measurement Techniques, Atmospheric Measurement Techniques, 11, 4883–4890, DOI: https://doi.org/10.5194/amt-11-4883-2018	
Press, W. H.; Flannery, B. P.; Teukolsky, S. A. & Vetterling, W. T. (1992). Numerical Recipes in C: The Art of Scientific Computing, Second Edition. Cambridge University Press. ISBN-13: 978-0521431088, New York	
Mead, M. I.; Popoola, O. A. M.; Stewart, G. B.; Landshoff, P.; Calleja, M.; Hayes, M.; Baldovi, J. J.; McLeod M. W.; Hodgson T. F.; Dicks J.; Lewis A.; Cohen J.; Baron R.; Saffell J. R. & Jones, R. L. (2013). The use of electrochemical sensors for monitoring urban air quality in low-cost, high-density networks. Atmospheric Environment, 70 (2013) 186-203	
Evans B., Beginning Arduino Programming, 2013	
Geddes M.: Arduino project handbook, 2016	
http://www.alphasense.com/index.php/air/products/ https://w3.siemens.com/topics/global/de/industrielle-netzwerke/Documents/artikel-pdf/en/siemens-industrial-networks-from-sensor-to-cloud.pdf http://tsi.com/miniature-black-carbon-monitor-model-ae51/ https://www.issep.be/wp-content/uploads/pp-black-carbon-may-2015.pdf	
CONSULTATIONS	**Day/hours:** **Mail:**

* Note: Course is in B/H/S languages and English, on-line Distance learning.

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Sustainable cities and eco innovation**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	Decode the Smart City concept & different models of Smart cities in the world Application of technological innovations for smart city enablement Identify and measure requirements of a smart city			
Learning outcomes	- Define the concept Smart Sustainable Cities from the perspective of various disciplines and cultures. - Ability to name and structure key elements and fields interlinked in SSC, their coverage in further course modules and future employment options. - Know the general outline of the history and existing EU policy context on Smart Sustainable cities. Comprehension - Understand the general current economic, social and environmental trends that jeopardize sustainable growth of cities. - Describe critically the (future) sustainability challenges (needs) cities are/will be confronted with. Application - Apply various models, methods, techniques for measuring / monitoring smart sustainable cities Analysis - Analyze / compare sustainability / sustainability aspects of cities by applying models for measuring sustainable cities			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Course introduction. General course introduction, course programme, practical experiences, workshops, field visits, teaching material final exam.	2	
2.	Introductory course on SSC	2	
3./4.	Smart Sustainable Cities – methodologies	2	2
5./6.	Smart Sustainable Cities - the Social Design	2	2
7./8.	The physical transition: energy and materials supply & demand in city environment	2	2
9.	New forms of Entrepreneurship & open innovation accelerators	2	
10.	Conceptual Elements of Smart City	2	
11./12.	Smart City Innovation; Smart City Risk; Enterprise Architecture	2	2
13.	Cross-organizational Management, Policy innovation; Branding for Marketing; Demand-focused Initiative	2	
14.	Larger Environmental Context; Challenging conventional beliefs	1	
15.	Test	1	1
		20	10
	Total	20	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points*	5	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

	<70% = dropout.		
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works (homeworks)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Abramson, M. A., & Lawrence, P. R. (2001). The challenge of transforming organizations: Lessons learned about revitalizing organizations. In M. A. Abramson & P. R. Lawrence (Eds.), Transforming Organizations. Lanham, MD: Rowman & Littlefield. Al-Hader, M., & Rodzi, A. (2009). The smart city infrastructure development & monitoring. Theoretical and Empirical Researches in Urban Management, 4(2), 87-94. Al-Hader, M., Rodzi, A., Sharif, A. R., & Ahmad, N. (2009a). Smart city components architecture. In Proceedings of the International Conference on Computational Intelligence, Modelling and Simulation, Brno, Czech Republic, September 7-9. Al-Hader, M., Rodzi, A., Sharif, A. R., & Ahmad, N. (2009b). SOA of smart city geospatial management. In Proceedings of the 3rd UKSim European Symposium on Computer Modeling and Simulation, Athens, Greece, November 25-27. Altschuler, A., & Zegans, M. (1997). Innovation and public management: Notes from the state house and city hall. In A. Althschuler & R. Behn (Eds.), Innovation in American Government. Washington, DC: Brookings Institution.	Based on teacher suggestions
Dejan D. Drajić (2018): Pametni gradovi. Univerzitet u Beogradu – Elektrotehnički fakultet.	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Economic and organisation of UA production**			
Course code	Semester	Course status	ECTS	Contact hours
-	II	Elective	3	30

Required pre-laid courses	
Teaching staff	Programme Director
	Teachers

Description	The course introduces students to application methods for the management and organization of farms engaged in urban agriculture.
Learning outcomes	After successfully completing the module, the student will be able to: 1. Prepare a business plan; 2. Demonstrate the basics of bookkeeping; 3. Prepare budget and forecasting statements; 4. Implement production / inventory management tactics; 5. Summarize business financing options; 6. Produce marketing strategies; 7. Analyze the implication of taxes; and 8. Forecast and develop business strategies to sustain and grow a landscape design company.

Course Outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Organization of the course, introduction to teaching environment, literature, grading.	2	
2.	Identify proper steps to management; Distinguish between cash accounting systems and their uses	1	1
3.	Complete and balance a financial statement	1	1
4.	What is an Entrepreneur, The Business Plan, Legal Forms of Business	1	1
5.	Key components of a Business Plan	1	1
6.	Bookkeeping, Balancing Book, Income and Expenses, Accounting vs. Bookkeeping	2	
7.	Budgeting and Forecasting	2	
8.	Building Relationships, Sales Process	2	
9.	Marketing, The Marketing Plan, Positioning	2	
10.	Understanding Cash Flow, Alternatives to Financing	1	2
11.	Financial Statements and Analysis	1	2
12.	Types of Financing and Financing Options	2	
13.	About Taxes, Source Deductions, Sales Taxes	2	
14.	Exit Strategies, Expansion, Planning for the Future	2	
15.	Project presentations.	2	2
	Total	20	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* ***<70% = dropout.***	5	
	Activtes *-Theory*	15	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

	-Practical work		
	Colloquium class	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
John Sumelius: Farm Level Economics and How to Change Behaviour, Economic and Business Principles for Farm Management	Dana Martin and Melissa Fery (2011): Growing Farms: Successful Whole Farm Management Planning Book
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Renewable energy sources

COURS

Course name	**Renewable energy sources: basics and applications**

Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30

Required pre-laid courses	

Teaching staff	Programme Director	
	Teachers	

Description	The aim of this course is to introduce students with the possibility of using renewable energy sources: solar radiation, geothermal energy, biomass, wind energy. Within the scope of the course, the basic indicators and characteristics of some renewable energy sources will be given, their availability and application possibilities, and comparison with conventional systems. A special aspect will be directed to the application of renewable energy sources in industry, particularly agriculture. Students will have the opportunity to get acquainted with the economic and environmental indicators of these systems and the barriers to their application.
Learning outcomes	Upon competition of this course, students should be able to: – Understanding the importance of using renewable energy sources, – Understanding of the possibilities of using, – Advantages of using renewable energy sources in relation to conventional systems, – Identify ways of using renewable energy sources in agriculture – Identify possible barriers to the use of renewable energy sources, – Estimation of investment and exploitation cost of renewable energy systems.

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction of course organization, teaching conditions, literature, grading, definition of home works themes	2	
2.	Definition of renewable energy sources, availability and application possibilities, level of using in the world.	2	
3.	Examples of using renewable energy sources, comparison renewable energy systems with conventional systems	2	
4.	Solar energy - fundamentals, solar geometry	2	
5.	Solar irradiation, measurement of solar irradiation	2	
6.	Solar heating systems, solar collectors and other components of system	2	
7.	Solar PV systems, economic and environmental indicators of solar system	2	
8.	Written works (home works) – review and short presentation	2	
9.	Definition of biomass, basic parameters of biomass, biomass potential in B&H, examples of using biomass as a fuel in agriculture	2	
10.	Energy system using biomass, comparison with conventional systems, economic and environmental indicators	2	
11.	Geothermal systems – fundamentals, geothermal energy potential in B&H and others regions, examples of using geothermal energy in agriculture	2	
12.	Conversion of geothermal energy into heat and electricity, economic and environmental indicators for geothermal systems	2	
13.	Wind energy – fundamentals, trends in wind system technology, barriers into implementation	2	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

14.	Small hydropower plants - fundamentals	2	
15.	Written works (home works) – review and short presentation	2	
	Total	30	
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Written works (home works)	40	
	Final exam	50	

LITERATURE	
Mandatory	**Elective**
W. Beckman, Solar heating design, USA, 1977.	
Lund, W. John, and CO, Geothermal direct use engineering and design guidebook, USA, 1998.	
T. Burton, D Sharpe, N. Jenkins, E. Bossanyi, Wind energy, Handbook, England, 2001.	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in B/H/S languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

2.9 Syllabi: second semester for UP and UHZ

Study program		Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)	
		Programme name	Urban agriculture	
COURSE				
Course name	**Processing of fruits and vegetables**			
Course id	Semester	Course status	ECTS	Contact hours
	II	Mandatory	6	60
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	The aim of the course is to define the Principles of the Technology of Fruits and Vegetable Processing, main processes, preserved food products, quality and safety aspects.			
Learning outcomes	After successfully completing the module, the student will be able to: - Historical data of preservation industry development, raw and secondary materials characteristics, heat transfer, basic processes and methods, concentration, evaporation, drying, radiation, sterilisation, high pressures, hurdle technologies, plant material preserved food, concentrates and juice production, changes of preserved foods, chemical content, water characteristics in preservation industry, packing materials, legislative, quality and safety aspects of preserved foods.			

Course Outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Historical description for the treatment of foods	2	2
2.	Theoretical basis of heat transmission	2	2
3.	Unit Operations in the Conservation Industry	2	2
4.	Main technological operation for fruit processing, calculation of aded ancilary materials	2	2
5.	The process of sterilization in the conservative industry	2	2
6.	Production of fermentable products, principle, fermetation procecess	2	2
7.	Canned vegetables of plant origin, conservation changes of plant origin. 1st semestral test	2	2
8.	Canned fruit	2	2
9.	Fruit juices	2	2
10.	Processing of vegetables, determination of degrese od ripening, Metod of sterilization	2	2
11.	Other canned vegetable	2	2
12.	Water in the cannery industry	2	2
13.	Fruits and vegetables as raw material and food	2	2
14.	Microflora of fruits and vegetables	2	2
15.	Chemical composition of fruits and vegetables 2nd semestral test	2	2
	Total	30	30
	To determine the final grade: From 50 – 59 accumulated point take the grade 6 (six).		

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

	From 60 – 69 accumulated point take the grade 7 (seven) From 70 – 79 accumulated point take the grade 8 (eight) From 80 – 89 accumulated point take the grade 9 (nine) From 90 – 100 accumulated point take the grade 10 (ten) (Note: all details regarding the grading procedures are incorporated in the Regulation for midterms and final exam) **Attendance** (90-100% attendance = 5 points; 80-90% = 4 points; 70-80% = 3 points <70% = denied attending attendance	5	
	Activity and practical skills and essays - Activity during classes - Activity during lectures - Activity during exercise	15	
	Mid-term exam	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
KONGOLI R., BOCI I. - Book: Technology of Fruits and Vegetables Processing, 2007	Pallota, et al,. Industrie delle conserve,
CONSULTATION	**Day /Hour:** **Mail:**
* Note: Theoretical instruction will be offered both in domestic and in English, but also as on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Co-funded by the Erasmus+ Programme of the European Union

Study programme	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban horticulture production**			
Course code	Semester	Course status	ECTS	Contact hours
	II	Mandatory	6	60

Required pre-laid courses	
Teaching staff	Programme Director
	Teachers
Description	The purpose of the course is to increase professional capacity of students on different aspects of horticulture production, different agro- ecologic conditions, and adequate agro technical measures to be applied on horticulture production, starting from a quality seed up to proper harvesting techniques that are the determinant measures for the optimal horticulture yield and quality. The course provides knowledge of potential of urban agriculture in environmental planning, management, and development. Topics to be covered include fundamentals of a sustainable food system, horticultural principals and techniques, the place of food systems in urban planning, urban agriculture accommodated within the urban environment, and contemporary examples of community gardening and urban agriculture locally and in other parts of the country. The principles of stormwater and solid waste management, nutrient and water cycles, and sustainable material sourcing will be explored as well.
Learning outcomes	After successfully completing the module, the student will be able to: - Gain exposure to the terms and practice of urban agriculture - Develop an understanding of how urban resource systems function, with a focus on horticulture food systems - Identify specific ways that urban agriculture can be applied - Describe and debate the feasibility of urban agriculture and its role in our urban food system - Recognize the limitations and benefits of urban horticulture production

Course outline

Week	Course unit	Contact hours	
		L*	E
1.	Introduction to structure, growth and development of horticultural plants from a practical and scientific approach; environmental effects, basic principles of propagation, greenhouse and outdoor production, nutrition, pruning and chemical control of growth, pest control and branches of horticulture	2	2
2.	Plant Growth: Soil and Nutrition Plant Nutrition in Environmentalfriendly Horticultural Systems Soil management, fertilization of horticultural crops	2	2
3.	Indoor ornamentals, landscape ornamentals	2	2
4.	Home landscaping, container gardens, herbs and medicinal plants and hobby greenhouse management	2	2
5.	Principles and practices of grading, drainage and construction of residential and small commercial landscapes; cost and bid estimation	2	2
6.	Managing yield and quality in fruit trees and horticultural crops	2	2
7.	Rootstocks, cultivars, identification, site selection, pollination, pruning, fruit thinning	2	2
8.	The effects of organic and nonorganic practices on the garden ecosystem.	2	2
9.	Propagation, Pruning and Grafting	2	2
10.	Greenhouse: Controlled Environments –guest lecture	2	2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

11.	Identification and use of indigenous and introduced landscape plants; plants for special uses in urban environments; emphasis on plants' ornamental attributes, cultural requirements, and adaptability in urban and suburban environments	2	2
12.	Orchard culture management, irrigation, pest control, harvesting and post harvest physiology of temperate fruit species	2	2
13.	Winegrape culture - influence of climate, soil, cultivar, rootstock Nutrition, water, spacing, trellis, pruning, IPM and harvest	2	2
14.	Analysis of contemporary economic, technological, environmental, human resource, and regulatory issues that impact the way global horticultural firms compete; Emphasis on problem recognition and analysis of managerial decisions by firms throughout the entire horticultural supply chain	2	2
15.	Methods and practices related to production of horticultural crops; practical exercises in greenhouse and field	2	2
	Total	30	30
	Attendance *(90-100% attendance=5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = it is denied the verification of attendance*	5	
	Activity and practical skills and essays *-Active during lecture* *-Active during exercise*	15	
	Mid-term exam	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
Arteca, R. 2015, Introduction to Horticultural Science, 2nd ed., Gengage Learning, Stamford, USA, p. 584. Shyr, C.L. & Reily, H.E. 2017. Introductory Horticulture, 9th ed. Gengage Learning, Stamford, USA, p. 5.	Depends on lecturer
CONSULTATION	**Day/Time:** **Mail:**
*Note: Theoretical lessons will be offered both in native and in English as well as on-line Distance Learning	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Technology and engineering in urban environment**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Mandatory	6	60
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	The course introduces students to UA power and machinery, agricultural electrification and applications (motors, controls, and materials handling and processing), agricultural structures (plans, loads, construction materials and layout and design), and soil and water conservation (surveying, mapping, drainage and conservation structures). The course introduces also methodologies in the broad spectrum of agricultural mechanization including safety, tool identification and use, construction methodology, agricultural power systems, and application of methodologies through structured experiential activity			
Learning outcomes	Upon completion of this course, student should be able to: ❖ Analyse major issues and constrains on urban engineering; ❖ Identify the constrains related to the agricultural power and machinery; ❖ Identify agricultural electrification and application; ❖ Understand small-scale production system and agricultural structuress in small area ❖ Understand soil and water conservation and conservation structures ❖ Understand surveying equipment, hand and power tools, measuring devices, tools, and diagnostic equipment ❖ Improving field efficiency, matching machine size and capacity: theoretical, effective, and actual field capacities			

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to course organization, teaching conditions, literature, grading.	2	
2.	Definition of urban agriculture engineering. Typical questions associated with machinery management	2	
3.	Power and machinery (engines, power transmission including hydraulics, tillage machinery, calibrations, and harvesting equipment)	2	2
4.	Agricultural electrification and applications (motors, controls, and materials handling and processing)	2	2
5.	Agricultural structures (plans, loads, construction materials and layout and design)	2	2
6.	Soil and water conservation (surveying, mapping, drainage and conservation structures)	2	2
7.	Matching machine size and capacity: theoretical, effective, & actual field capacities	2	2
8.	Soil conservation for cropland: Vegetative cover, Mulches, No-till planting, Ridge-till planting, Contour planting, Cover crops, Crop rotations, Strip cropping, Terraces	2	2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

9.	Small-scale production system in small areas in or on the house (balcony, windowsill, cellar, barn, rooftop, and kitchen) as well as around the house (front and backyard, patio).	2	2
10.	Scope of horticultural crops. Soil and climatic requirements for different horticultural crops, improved varieties, criteria for site selection	2	2
11.	Garden tools, farm implements and structures for horticulture crop management	2	2
12.	Farm planning and management, access to information on advanced and sustainable technologies, market information and sources of financing	2	2
13.	Sustainable water practices in UA, irrigation systems and equipment	2	2
14.	Set up, adjust, operate, and maintain agricultural machinery and equipment	2	2
15.	Field visit		8
	Total	28	32
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% =dropout.*	5	
	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works(homework's)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
Erasmus +, Urban Green Train, http://www.urbangreentrain.eu/upimg/pdf/Module_1_final_version-compressed.pdf	
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in Alb. languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Study programme	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Planning and urban design**			
Course code	Semester	Course status	ECTS	Contact hours
	II	Elective	3	30
Required pre-laid courses				
Teaching staff	Programme Director			
	Teachers			
Description	The purpose of the course is to explore and understand urban sustainable development in the context of planning and design and to indicate how its practice can be improved, as well and to prepare students for more effective interdisciplinary work in urban design. The course introduces students how cities, suburbs, and metropolitan areas change. A special emphasis is about the ideas of a wide range of people who have addressed urban problems and acted to alter cities, suburbs, and regions through urban design and development. It enables students to understand basic concepts and definitions related to planning and urban design. It is about arranging land uses, transportation networks and amenities in order to create a fabric that can foster healthy, functional and vibrant communities.			
Learning outcomes	After successfully completing the module, the student will be able to: - Identify and understand planning and urban design; - Understand the application of basic urban design; - Identify and apply planning and design methodologies that contribute to urban sustainable development, including tools for assessment; - Identify main characteristics of different city districts and analyse these in relation to urban sustainable development, - Understand the goals, the main steps, and challenges in planning and urban design - identify and characterize main actors of urban sustainable development			

Course outline

Week	Course content	Contact hours	
		T*	P
1.	Organization of the course, introduction to teaching environment, literature, grading.	2	
2.	The concept of urban sustainable development.	1	
3.	Differences between policy, science and planning documents	1	
4.	Urban sustainable development and perspective	1	1
5.	Comparing the urban structures and the urban life of areas from different epochs	1	1
6.	The outcomes of planning and design	1	1
7.	How could plans and designs best address the challenge	1	1
8.	The process of planning and design	1	1
9.	Role of involved stakeholders	1	
10.	Examples of implementation for planning and urban design. Project.	2	1
11.	Examples of implementation for planning and urban design. Project.	2	1
12.	The role of local planning in the development of space.	1	1
13.	Elements of Urban Design	2	1
14.	Creating a balance of land use, parameters and indicators	1	1
15.	Project presentations.		2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

	Total	18	12
	Attendance *(90-100% attendance=5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = it is denied the verification of attendance*	5	
	Activity and practical skills and essays *-Active during lecture* *-Active during exercise*	15	
	Mid-term exam	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
Steiner, Frederick and Kent Butler, eds. 2006. Planning and Urban Design Standards: Student Edition. New York: Wiley	Depends on lecturer
Tiesdell, S., & Adams, D. (2011). Urban design in the real estate development process. Chichester: Wiley-Blackwell	
CONSULTATIONS	**Day/hours:** **Mail:**
*Note: Theoretical lessons will be offered both in native and in English as well as on-line Distance Learning	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Study programme	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Cultivation of medicinal and aromatic plants**

Course code	Semester	Course status	ECTS	Contact hours
	II	Elective	3	30

Required pre-laid courses	

Teaching staff	Programme Director	
	Teachers	

Description	The purpose of the course is to introduce knowledge for the cultivation and use of medicinal and aromatic plants in medicine and new methods of medicinal and aromatic plant research. It enables students to understand the cultivation of medicinal and aromatic plants in urban agriculture. The course introduces student's history, scope, opportunities and constraints in the cultivation and maintenance of medicinal and aromatic plants. Importance, origin, distribution, area, production, climatic and soil requirements, propagation and nursery techniques, planting and after care, cultural practices, nutritional and water requirements. Plant protection, harvesting and processing of medicinal and aromatic plants.
Learning outcomes	After successfully completing the module, the student will be able to: - Understand general principles of the agronomy and cultivation of aromatic and medicinal plants and the tools for their application - Understand to read, analyze, and discuss research literature dealing with medicinal and aromatic plants - To identify evidence-based information for the cultivation and use of medicinal and aromatic plants, - To analyze and appraise correct information.

Course Outline

Week	Course content	Contact hours	
		T*	P
1.	Organization of the course, introduction to teaching environment, literature, grading.	2	
2.	Historical aspects, terminology and definitions	2	
3.	The economic importance of aromatic and medicinal plants in Kosovo	2	
4.	Cultivated species and cultivation areas	2	
5.	The cultivation and wild harvest, and their impact on product quality and the environment	2	1
6.	The main agro-environmental factors affecting the production and quality of raw material:	2	
7.	Harvest and first processing and their influence on the quality of final product	2	1
8.	Good agricultural and collection practices for medicinal plants (GACP)	2	1
9.	The organization of the production supply chain	1	1
10.	Examples of cultivation of medicinal and aromatic plants. Project.		2
11.	Examples of cultivation of medicinal and aromatic plants. Project.		2
12.	Biological aspects of natural active compounds present in plants	1	
13.	The use of medicinal and aromatic plants in modern medicine	1	
14.	The use of medicinal and aromatic plants in cosmetics	1	
15.	Project presentations.		2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	Total	20	10
	Attendance *(90-100% attendance=5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = it is denied the verification of attendance*	5	
	Activity and practical skills and essays *-Active during lecture* *-Active during exercise*	15	
	Mid-term exam	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
MANDATORY	**OPTIONAL**
Yaniv Z and Bachrach, U. Handbook of Medicinal Plants.2005. The Haworth Press. NY.	**Depends on lecturer**
CONSULTATIONS	**Day/hours:** **Mail:**
*Note: Theoretical lessons will be offered both in native and in English as well as on-line Distance Learning	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Study program	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Information science and communication**			
Course code	Semester	Status	ECTS credits	Contact hours
	II	Elective	3	30

Required pre-laid courses	
Teaching staff	Programme Director
	Teachers
Description	The course introduces students to UA Information Science and Communication in different fields of agriculture (food, nutrition, biotechnology...) and life-sciences, databases in other scientific fields (market/trade, social information), theses databases, citation databases, etc. Information Science and Communication aims the increasing knowledge of students regarding the role and main principles of the Information Science and Communication.
Learning outcomes	Upon completion of this course, student should be able to: • Describe the concept of the Information Science and Communication. • Describe the Characteristics of scientific and technical information. • Describe the main digital library catalogues. • Know the electronic journals and full-text databases. • Know the bibliographic data editing in text processors;

Course outline

Week No:	Course unit	Contact hours	
		T*	P
1.	Introduction to the course content and aims	2	
2.	Characteristics of scientific and technical information	1	
3.	Specific databases in different fields of agriculture (food, nutrition, biotechnology...) and life-sciences, databases in other scientific fields (market/trade, social information), theses databases, citation databases.	2	
4.	Database structure and principles of advanced search syntax.	1	
5.	Main world digital library catalogues.	1	1
6.	Digital library catalogues.	1	1
7.	Statistical databases, databases for patents and intellectual, property, databases of standards, legislation.	2	2
8.	Midterm exam.	0	1
9.	Document types and formats.	2	2
10.	Internet and advanced retrieval techniques on the web.	1	1
11.	Electronic journals and full-text databases.	2	1
12.	Characteristics of scientific language, classifications.	1	
13.	Bibliographic data editing in text processors.	2	
14.	Synthesis of texts according to scientific principles (IMRAD), compilation of personal bibliographies, written projects/seminars.	1	
15.	Interpretation of information.	1	1
	Total	20	10
	Attendance *(90-100% =5 points; 80-90% =4 points; 70-80%= 3 points* *<70% =dropout.*	5	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	Activates *-Theory* *-Practical work*	5	
	Colloquium class	25	
	Written works(homework's)	20	
	Final exam	45	

LITERATURE	
Mandatory	**Elective**
-Baeza-Yates R., Ribeiro-Neto B. Modern information retrieval: the concepts and technology. - 2nd ed. - Harlow, Addison Wesley (2011). 913 p. ISBN 978-0-321-41691-9. (selected chapters) -Blanchett H., Powis C., Webb J. A guide to teaching information literacy: 101 practical tips London, Facet (2012). 262 p. ISBN 978-1-85604-659-6. (selected chapters)	-Materials for lectures and exercises (script) prepared by teacher which will be submitted to students at the end of each lecture. -Scientific articles that can be found on the Internet pages of scientific journals.
CONSULTATIONS	**Day/hours:** **Mail:**
* Note: Course is in Alb. languages and English, on-line Distance learning.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Co-funded by the Erasmus+ Programme of the European Union

Study programme	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban beekeeping**			
Course code	Semester	Course status	ECTS	Contact hours
	II	Elective	3	30

Required pre-laid courses	
Teaching staff	Programme Director
	Teachers
Description	The purpose of the course is to provide a broad overview of bee biology, beekeeping and research frontline in apiculture. The lectures starts by a part of fundamentals in biology of honey bees, emphasizing the development of sociality and beekeeping management, how to start and maintain an apiary, types of beehives, where to install an apiary, inspections of beehives, best management practices, hive management in spring, summer, autumn and winter, migratory beekeeping, how to prevent swarming, honey harvesting, how to raise queens, how to produce new nucleus colonies. Course also provides with the current bee diseases, pests and predators, with special emphasis on biological control. The practical part provides instruction to bee morphology and physiology, identification of glands, grafting larvae into artificial queen cell cups, quantification of Varroa infestation and acaricide treatments. The most common types of Alpine honey are examined. Excursions to research bee centers and apiaries are planned.
Learning outcomes	After successfully completing the module, the student will be able to: - Have basic knowledge of bee morphology and physiology; - Associate apiculture with local agriculture products, ecosystem services and human history; - Understand the importance of honey bees as critical pollinators for both natural environments and crops productions; - Start and maintain an apiary; - Control bee diseases and pests; - Have a broad idea of international research in apiculture

Course outline

Week No:	Course content	Contact hours	
		T*	P
1.	Beehives, Beekeeping, Langstroth Hive Discussion of course syllabus and course materials Beekeeping Basics – importance of reading the book	2	
2.	Components of the Modern Beehive	1	
3.	Protective clothing for working with bees Tools for working with bees	1	1
4.	Installing Package Bees When the package arrives, Hive preparation, Installing bees, Installing the Queen, Feeding the newly installed bees	1	1
5.	Assembling Frames, Wax foundation, Wiring The frame, Embedding the wire	1	1
6.	Setting up an Apiary Location Shelter concerns, Solar concerns, Topographical concerns, Human & Animal habitation concerns, Good Neighbour policy	1	1
7.	Understanding Honeybee Behavior Bee Culture Bees organization in the hive, Swarming, Bee space, Robbing	1	1
8.	Understanding the Life Cycle of the Honeybee and Colony Organization Types of Honeybees, Development of Honeybees (practical biology)	1	1

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	Contribution of Honeybees		
9.	Fall and Winter Management Evaluating colony condition & population • Evaluating food stores Feeding colonies, Protecting colonies from the elements Requiring a colony	1	1
10.	Spring & Summer Management Overwintered Hives Late Winter inspection of food stores Early Spring inspection of food stores Spring evaluation and inspection, Swarm prevention	2	1
11.	Bee Pests, Parasite and Diseases Brood diseases, Symptoms of brood disease	1	1
12.	What is a Varroa Mite, and how did they end up here (in the US and in my hive). How to know if your hive has Varroa mites, Applying mite pesticide	2	1
13.	Integrated Pest Management (IPM) Proper use of medications	1	
14.	Identifying & Controlling Honeybee Diseases Tracheal mites & Varroa mites Animal pests, Comb damaging moths (Wax moths) Minor insect pests, Small hive beetles, Fungus diseases Non-infectious diseases, Chilled brood, Adult honeybee diseases	2	
15.	Project presentations.	2	
	Total	20	10
	Attendance *(90-100% attendance=5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = it is denied the verification of attendance*	5	
	Activity and practical skills and essays *-Active during lecture* *-Active during exercise*	15	
	Mid-term exam	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
Delaplane, K.S. 2006. Honey Bees and Beekeeping: A Year in the Life of an Apiary, 3rd Edition. The Georgia Center for Continuing Education, Athens, USA. Ross, C. 2007. Natural Beekeeping: Organic Approaches to Modern Apiculture, White River Junction, London, UK.	Depends on lecturer
Dadant C.P., Dadant C.C., Dadant M.G., Dadant J.C. (eds.) The Hive and The Honeybee. Dadant and Sons, Inc. Hamilton, USA. Sammataro D., Avitabile A. 2011. The Beekeeper's Handbook, 4th edition. Cornell University Press, USA.	
CONSULTATIONS	**Day/hours:** **Mail:**
*Note: Theoretical lessons will be offered both in native and in English as well as on-line Distance Learning	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

Co-funded by the Erasmus+ Programme of the European Union

Study Program	Programme type	Master degree (Second cycle degree/Two year Master – 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Plant protection in urban agriculture**			
Course code	Semester	Course status	ECTS	Contact hours
	II	Elective	3	30

Required pre-laid courses		
Teaching staff	Programme Director	
	Teachers	

Description	This course aims to introduce to the students the major pest groups of economic crops and the principal measures for their control. It includes the classification and life - history of selected species of pest groups; the damage induced; the crop loss assessment. Special emphasizes will be given to the principal measures of pest control with examples from pest problems occurring in the Urban Agriculture. Finally there will be introduction of Integrated Pest management (IPM) relevance in Urban Agriculture.
Learning outcomes	The successful completion of this course will enable students to: • be familiar with general classes of insects, diseases and weeds in urban agriculture, • know how to determine the pests, diseases and weeds in urban agriculture, • recognize the morphology, anatomy, biology and ecology of pests, diseases and weeds in urban agriculture, • know the ways of causing damages to urban agricultural crops, determine the most appropriate measures for the prevention and management of these pests in crops, • Apply the gained knowledge into the praxis.

Course outline

Week No:	Course content	Contact hours	
		T*	P
1.	Introduction in plant protection in urban agriculture.	2	
2.	The classes of the main pests (Insects, mites, nematodes, diseases and weeds) in Urban Agriculture	2	
3.	The morphology, anatomy and biology of the insects in urban agriculture	1	1
4.	Main pests of vegetables in urban agriculture	1	1
5.	Main pests in orchards and vineyards in urban agriculture	2	1
6.	Plant disease triangle, inoculation and infection stages	1	1
7.	Main diseases of vegetables in urban agriculture	1	1
8.	Main diseases of orchards and vineyards in urban agriculture	1	1
9.	Main weds flora in urban agriculture	1	1
10.	Weed Management in urban agriculture	1	1
11.	Plant protection measures in urban agriculture	1	1
12.	Cultural, mechanical, physical and biological control of pests, pathogens and weeds in urban agriculture	1	
13.	Plant Protection Products and their composition	2	1
14.	Integrated Pest Management in urban agriculture	2	
15.	National and EU Legislation regarding plant protection in General	1	
	Total	20	10
	Attendance *(90-100% participation=5 points; 80-90% =4 points; 70-80%= 3 points* *<70% =termination of course participation*	5	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"

	Activity and practical skills and essays *-Activities during lectures* *-Activities during practical work*	15	
	Mid-term exam	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
Alford, D. (1999): A textbook of Agriculture Entomology. Ministry of Agriculture, Fisheries and Food. Cambridge, UK. Andrews H. & Tommerup, I. (1995): Advances in Plant Pathology. Department of Plant Pathology The University of Wisconsin M.adison, Wisconsin USA. Strange, R. (2003): Introduction to Plant Pathology. John Wiley & Sons Ltd. The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England. Zimdahl, R. L. (2007): Fundamentals of Weed Science. Third edition. Elsevier, USA.	Trigiano, R., Windham, M. & Windham, A. (2004): Plant Pathology. Concepts and Laboratory Exercises. Boca Raton London New York Washington, D.C. Schowalter, T. (2006): Insect Ecology.Academis pres publication. United States of America.
CONSULTATIONS	**Day/hours:** **Mail:**
*Notes: The lectures will be delivered in Albanian as well in English languages. Based on request there will be on line-Distance learning as well.	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

Study programme	Programme type	Master degree (Second cycle degree/Two year Master - 120 ECTS)
	Programme name	Urban agriculture

COURSE

Course name	**Urban agriculture production systems**

Course id	Semester	Course status	ECTS	Contact hours
	II	Elective	3	30

Required pre-laid courses	

Teaching staff	Programme Director	
	Teachers	

Description	The purpose of the course is to introduce a whole farm approach, such as agroecology and holistic management, to urban agriculture, explore sustainable growing methods for higher yield production per unit area, and develop business and entrepreneurial skills. It enables students to understand basic concepts and definitions related to production systems and their application in urban agriculture. The course enables students to develop knowledge and skills related to the sustainable use of resources, and the production and marketing of a range of plants and their products. Plant production systems are a fundamental component of agriculture, which has never been more important than nowdays. Places of urban agriculture have numerous benefits: they cultivate healthier lifestyles, strengthen communities, teach stewardship, and provide economic opportunities.
Learning outcomes	After successfully completing the module, the student will be able to: - Identify and understand urban agriculture production systems; - Understand the basic concepts of urban agriculture and production systems; - Identify and understand the application of productions systems in urban agriculture; - Understand the goals, the main steps, and challenges in application of production systems in urban agriculture. - Understand to read, analyze, and discuss research literature dealing with urban agriculture production systems

Course outline

Week No:	Course content	Contact hours	
		T*	P
1.	Organization of the course, introduction to teaching environment, literature, grading.	2	
2.	History of urban agriculture	1	
3.	Introduction of urban Production Systems	2	
4.	Introduction to agricultural challenges, societal issues, environmental issues, economic challenges	2	
5.	Urban soils and management impacts on the environment	2	1
6.	Plant production principles	1	1
7.	Plant production practices	1	1
8.	Best managament practices in plant protection	1	1
9.	Best managament practices in plant nutrition	1	1
10.	Examples of implementation for urban agriculture production systems. Project.	1	2
11.	Examples of implementation for urban agriculture production systems. Project.	1	2
12.	Knowledge and management of plant production systems	1	
13.	Sustainable production	1	
14.	Plant health	1	1
15.	Project presentations.		2

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP “This project has been funded with support from the European Commission. This publication 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”

	Total	18	12
	Attendance *(90-100% attendance=5 points; 80-90% =4 points; 70-80%= 3 points* *<70% = it is denied the verification of attendance*	5	
	Activity and practical skills and essays *-Active during lecture* *-Active during exercise*	15	
	Mid-term exam	20	
	Homework and essays	20	
	Final exam	40	

LITERATURE	
Mandatory	**Elective**
Charlie W. Lesher, Jr. Urban Agriculture: A Literature Review, 2006. United States Department of Agriculture, Alternative Farming Systems Information Center, National Agricultural Library	**Depends on lecturer**
CONSULTATIONS	**Day/hours:** **Mail:**
*Note: Theoretical lessons will be offered both in native and in English as well as on-line Distance Learning	

Project number: 586304-EPP-1-2017-1-BA-EPPKA2-CBHE-JP "This project has been funded with support from the European Commission. This publication 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"