

Josip Juraj Strossmayer University of Osijek  
FACULTY OF AGROBIOTECHNICAL SCIENCES OSIJEK

# **CURRICULUM**

University Graduate Study Programme

**VEGETABLE AND FLOWER GROWING**

Academic Year 2022-23

June, 2022

# List of Teachers and Courses

Academic year 2022 - 23

University Graduate Study Programme

**VEGETABLE AND FLOWER GROWING**

A full-time Study Programme

**VEGETABLE AND FLOWER GROWING**  
University Graduate Study Programme

I. semester								
COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	LP	
Miroslav Lisjak	Plant Physiology in Vegetable and Flower Growing	Miroslav Lisjak Tihana Teklić	20 20	5			30	6
Monika Marković	Irrigation in vegetable and flower growing	Monika Marković	45	5	5	20		6
Tomislav Vinković	Patterns of vegetable production	Tomislav Vinković Boris Ravnjak	35	10	10	15	5	6
Domagoj Zimmer	Mechanization in vegetable and flower growing	Luka Šumanovac Mladen Jurišić Domagoj Zimmer Dorijan Radočaj	8 18 19	10		20		6
Tomislav Vinković	Modern Methods of Floriculture Growing	Monika Tkalec Kojić	35	10	5	20	5	6
II. semester								
COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	LP	
Vlado Guberac	Seed production in vegetable and flower growing	Vlado Guberac Sonja Vila Sonja Petrović	65 5 5					6
Zdenko Lončarić	Fertilization in Vegetable Growing and Floriculture	Zdenko Lončarić Brigita Popović Vladimir Ivezić	35 15 10	5			10	6
Jasenka Ćosić	Parasitic diseases agents of vegetables and flowers	Jasenka Ćosić Karolina Vrandečić Tamara Siber	30 35	10				6
Ankica Sarajlić	Insects and other pests in vegetables and flowers	Ankica Sarajlić Josipa Puškarić	55	20				6

**VEGETABLE AND FLOWER GROWING**

University Graduate Study Programme

Ružica Lončarić	Economics of Vegetable and Flower Production	Ružica Lončarić Ljubica Ranogajec Sanja Jelić Milković	30 30	5 10				6
<b>III. semester</b>								
COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	LP	
	Elective course							6
	Elective course							6
	Elective course							6
	Elective course							6
<b>IV. semester</b>								
COORDINATOR	COURSE NAME	TEACHERS ON THE COURSE AND TYPE OF CLASSES						ECTS
		NAME AND SURNAME	LECTURES	SEMINARS	EXERCISES			
					FP	AP	LP	
Andrijana Rebekić	Practical work II	Andrijana Rebekić				75		6
	Master thesis							30

**VEGETABLE AND FLOWER GROWING**  
University Graduate Study Programme

<b>PLANT PHYSIOLOGY IN VEGETABLE AND FLOWER GROWING</b>		
<b>Coordinator</b>	Miroslav Lisjak	
<b>Collaborators</b>	Tihana Teklić	
<b>Study year and semester</b>	First year, I. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	
	Number of hours (L+P+S)	75 (40L+30P+15S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to the applications of plant physiology in the cultivation of vegetables and flowers under controlled conditions and in open fields, as well as to the methodology for monitoring plant growth and development and evaluating the quality of plant products.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
After successfully completing the module, the student will be able to:		
<ol style="list-style-type: none"> <li>1. Describe the primary physiological processes in plants, focusing on different types of vegetables and flowers (photosynthesis, respiration, water regulation, flowering processes, and fruit formation).</li> <li>2. Interpret the significance and range of environmental factors influencing plant physiological processes, such as light, temperature, water availability, and the presence of harmful substances in the environment.</li> <li>3. Evaluate plant growth dynamics by measuring specific indicators, monitor yield formation, and apply appropriate technological measures to ensure optimal growing conditions.</li> <li>4. Predict the occurrence of abiotic stress, recognize plant responses to stress, and identify measures to prevent or mitigate the effects of stressful growing conditions to maintain and achieve desired plant productivity.</li> <li>5. Assess the quality of plant products by analysing specific indicators.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Student performance is regularly evaluated during teaching activities: attendance and participation in lectures and exercises are monitored, and knowledge is assessed through partial assessments or a final exam. A well-prepared and presented seminar paper provides a bonus towards a higher grade compared to the grade achieved on the exam (or partial assessments) or compensates for absences from parts of the lectures or exercises.</p> <p>In determining the final grade for students, the following are taken into account: continuous class participation (activity in class, preparation for class, and reflective analysis of course content), exercises (activity in class, preparation for class, and effectiveness in completing exercises), the seminar paper (preparation and presentation), and the final oral exam.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Pevalek-Kozlina, B. (2003): Fiziologija bilja. Profil International. Zagreb.</li> <li>2. Parađiković, N. (2009): Povrćarstvo. Opći i specijalni dio. Poljoprivredni fakultet Osijek</li> <li>3. Teklić, T. (2012): Fiziologija bilja u povrćarstvu i cvjećarstvu (skripta s predavanjima).</li> <li>4. Mandić, M. L. (2003): Znanost o prehrani: hrana i prehrana u čuvanju zdravlja. Prehrambeno tehnološki fakultet Osijek.</li> <li>5. Lisjak, M., Špoljarević, M., Agić, D., Andrić, L. (2009): Praktikum iz fiziologije bilja. Poljoprivredni fakultet Osijek.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Taiz, L. and Zeiger, E. (2006): Plant Physiology. 4th Edition. Sinauer Associates, Inc.</li> <li>2. Reiss, C. (1994): Experiments in plant physiology. Prentice Hall.</li> <li>3. Roger, M.J.R. (ed.) (2001): Handbook of plant ecophysiology techniques. Kluwer Academic Publishers.</li> </ol>		

**VEGETABLE AND FLOWER GROWING**  
University Graduate Study Programme

<b>IRRIGATION IN VEGETABLE AND FLOWER GROWING</b>		
<b>Coordinator</b>	Monika Marković	
<b>Collaborators</b>		
<b>Study year and semester</b>	First year, I. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	75 (45L + 25P + 5S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Provide students with knowledge about the importance of soil water content in vegetable cultivation and horticulture. Introduce them to drainage as a measure for managing land affected by excess surface and groundwater, as well as the methods and systems of irrigation in vegetable cultivation and horticulture.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the issues of unregulated water-air regimes in agricultural soils.</li> <li>2. Understand the problem of soil water deficiency as a result of drought.</li> <li>3. Select appropriate irrigation methods.</li> <li>4. Determine the elements of irrigation and become familiar with irrigation machinery.</li> <li>5. Define the source and quality of irrigation water.</li> <li>6. Recognize the specific requirements of irrigation in vegetable and flower production.</li> <li>7. List the maintenance practices for irrigation systems.</li> <li>8. Recommend irrigation practices in vegetable and flower production.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Eligibility to take the final exam is achieved by accumulating the minimum required number of assessment points. Assessment points are earned based on class attendance (minimum 70%), participation in class, and grades from partial exams. During the semester, students take two written partial exams (in the 7th and 15th weeks of classes). The final oral exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Šimunić, I. (2013.): Uređenje voda. Hrvatska sveučilišna naklada. Zagreb.</li> <li>2. Madjar, S., Šoštarić, J. (2009.): Navodnjavanje poljoprivrednih kutlura. Sveučilište Josipa Jurja Strossmayera. Poljoprivredni fakulte Osijek. Osječko-baranjska županija.</li> <li>3. Lešić, R., Borošić, J., Butorac, I., Ćustić, M., Poljak, M., Romić, D. (2002.): Povrčarstvo. Zrinski. Čakovec.</li> <li>4. Kos, Z. (1991.): Hidrotehničke melioracije tla – kvaliteta vode za navodnjavanje. Školska knjiga. Zagreb.</li> <li>5. Kos, Z. (1989.): Hidrotehničke melioracije tla – odvodnja i navodnjavanje. Školska knjiga. Zagreb.</li> <li>6. Tomić, F. (1988.): Navodnjavanje. Fakultet poljoprivrednih znanosti. Zagreb.</li> <li>7. Mađar, S. (1986.): Odvodnja i navodnjavanje u poljoprivredi. Zadrugar, Sarajevo.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Micheal, A.M. (1990): Irrigation Theory and Practice. Vikas publishing house PVT LTD New Delhi</li> <li>2. Kos, Z. (1991.): Kvaliteta vode za navodnjavanje. Školska knjiga. Zagreb.</li> <li>3. Grupa autora: Priručnik za hidrotehničke melioracije. II kolo Navodnjavanje. Knjiga 1 – 6. Društvo za odvodnju i navodnjavanje Hrvatske. Zagreb.</li> </ol>		

**VEGETABLE AND FLOWER GROWING**  
University Graduate Study Programme

<b>MODELS OF VEGETABLE PRODUCTION</b>		
<b>Coordinator</b>	Tomislav Vinković	
<b>Collaborators</b>	Boris Ravnjak	
<b>Study year and semester</b>	First year, I. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	75 (35L + 30P +10S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students with different models for vegetable production in greenhouses, tunnels, and open fields, as well as the methods of modern processes within this type of plant production.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
After successfully completing the module, the student will be able to:		
<ol style="list-style-type: none"> <li>1. List and describe vegetable crops and categorize them into groups based on the production model.</li> <li>2. Recommend a production model for a specific crop type according to agroecological and other environmental conditions.</li> <li>3. Identify the advantages and disadvantages of a specific vegetable production technology.</li> <li>4. Select and apply a specific production model based on the main characteristics of the crop, growing medium, and agroecological factors.</li> <li>5. Recognize vegetable diseases and pests and implement control measures.</li> <li>6. Manage the production process of vegetable crops and apply modern technical management systems.</li> <li>7. Predict yields and select appropriate markets for the products.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Eligibility to take the final exam is achieved by accumulating the minimum required number of assessment points. Assessment points are earned based on class attendance (minimum 70%), participation in class, and grades from partial exams. During the semester, students take two partial exams (in the 7th and 15th weeks of classes). The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade. The final exam is oral.		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Parađiković, N. (2014): Opće i specijalno povrćarstvo – online skripta, Poljoprivredni fakultet u Osijeku</li> <li>2. Welbaum, G.E. (2015): Vegetable production and practices, CAB International, Wallingforth, Oxfordshire, UK</li> <li>3. Vinković, T., Popović, B., Stošić, M., Lončarić, Z., Kristek, S., Ivezić, V., Tkalec Kojić, M., Jović, J., Ravnjak, B. (2019.): Okolišno prihvatljiva proizvodnja povrća, Fakultet agrobiotehničkih znanosti Osijek</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Todorović, V., Zeljković, S., Moravčević, Đ. (2019): Proizvodnja rasada povrća i cvijeća, Poljoprivredni fakultet Univerziteta u Banjoj Luci</li> <li>2. Scientific and professional papers from relevant journals and databases related to the production of vegetable and floricultural crops.</li> </ol>		

## VEGETABLE AND FLOWER GROWING

University Graduate Study Programme

<b>MECHANIZATION IN VEGETABLE AND FLOWER GROWING</b>		
<b>Coordinator</b>	Domagoj Zimmer	
<b>Collaborators</b>	Luka Šumanovac Mladen Jurišić Domagoj Zimmer Dorian Radočaj	
<b>Study year and semester</b>	First year, I. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	L- 47, P - 22, S – 6
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to the mechanization—machines, tools, and equipment used in vegetable and flower cultivation in open fields and controlled environments.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
After successfully completing the module, the student will be able to: <ol style="list-style-type: none"><li>1. Define vegetable and flower cultivation methods based on the principles of precision agriculture.</li><li>2. Describe the principles and list the main working components of traction and propulsion units in vegetable and flower production. Explain the principles of tools for primary and supplementary soil cultivation, bed and ridge formation, tunnel layers, sowing and planting equipment for open and closed spaces, with a focus on sowing and planting techniques under plastic mulch.</li><li>3. Select the optimal technical and technological solution for fertilization and pesticide application.</li><li>4. Define the ecological aspects of mechanized vegetable and flower production.</li><li>5. Describe the principles and list the main working components of vegetable and flower harvesting machines.</li><li>6. Optimize production costs of vegetables and flowers using thematic maps.</li><li>7. Prepare and present a given topic related to machines and equipment used in vegetable and flower production.</li></ol>		
<b>Assessment and evaluation of student work during classes</b>		
Eligibility to take the final exam is achieved by accumulating the minimum required number of assessment points. Assessment points are earned based on class attendance (minimum 70 %), participation in class, and the evaluation of seminar work. During the semester, students present their seminar papers (in the 14th week of classes). The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade. The final exam is written.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"><li>1. Bajkin, A.: Mehanizacija u povrtarstvu, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Novi Sad, 1994.</li><li>2. Bajkin, A., Orlović, S., Ponjičan, O., Somer, D.: Mašine u hortikulturi, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Novi Sad, 2005.</li><li>3. Brčić, J.: Mehanizacija u povrćarstvu, Fakultet poljoprivrednih znanosti, Zagreb, 1991.</li><li>4. Čuljat, M., Barčić, J.: Poljoprivredni kombajni, Poljoprivredni institut Osijek, Osijek, 1997.</li><li>5. Jurišić, M., Plaščak, I.: Geoinformacijske tehnologije GIS u poljoprivredi i zaštita okoliša, Sveučilište Josipa Jurja Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku, Osijek, Tisak „Zebra“, Vinkovci, 2009.</li><li>6. Scientific and professional papers published in reputable international journals to be used for seminar preparation.</li></ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"><li>1. Brčić, J.: Mehanizacija u biljnoj proizvodnji, „Školska knjiga“, Zagreb, 1987.</li><li>2. Storck, H.: Taschenbuch des Gartenbaues, 3. Auflage, Verlag Eugen Ulmer GmbH &amp; Co, Stuttgart (Hohenheim), 19941. Rannertshausen, J.: Thermische Unkrautbekämpfung, KTBL – Arbeitsblatt Nr. 0665, Berlin, 1990.</li><li>3. Zimmer, R. i sur.: Poljoprivredna tehnika u ratarstvu, Poljoprivredni fakultet u Osijeku, Osijek, 2009.</li></ol>		



**VEGETABLE AND FLOWER GROWING**  
University Graduate Study Programme

<b>MODERN METHODS OF FLORICULTURE GROWING</b>		
<b>Coordinator</b>	Monika Tkalec Kojić	
<b>Collaborators</b>		
<b>Study year and semester</b>	First year, I. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	75 (35L + 30P + 10S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Familiarization and identification of flower species according to their purpose. Introduce students to the options for selecting models in modern flower cultivation in greenhouses, tunnels, and open fields, as well as the methods of modern processes within this type of plant production.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
After successfully completing the module, the student will be able to:		
<ol style="list-style-type: none"> <li>1. List and describe floricultural crops and categorize them into groups based on vegetation duration and production method.</li> <li>2. Recommend a production method for a specific species according to agroecological and other environmental conditions.</li> <li>3. Identify the advantages and disadvantages of a specific flower production technology.</li> <li>4. Select and apply a specific production method based on the main characteristics of the species, growing medium, and agroecological factors.</li> <li>5. Recognize diseases and pests of flower species and implement control measures.</li> <li>6. Manage the production process and apply modern technical management systems.</li> <li>7. Predict yields and ensure good flower or seedling quality through proper cultivation technology.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Eligibility to take the final exam is achieved by accumulating the minimum required number of assessment points. Assessment points are earned based on class attendance (minimum 70 %), participation in class, and grades from partial exams. During the semester, students take two partial exams (in the 7th and 15th weeks of classes). The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade. The final exam is oral.		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Parađiković, N., Tkalec Kojić, M., Zeljković, S., Kraljićak, J., Vinković, T. (2018): Osnove florikulture, Poljoprivredni fakultet u Osijeku</li> <li>2. Parađiković, N. (2008): Jednogodišnje, dvogodišnje i višegodišnje cvjetne vrste i Uzgoj cvijeća u zaštićenom prostoru (predavanja – interna skripta)</li> <li>3. Dole, J.M., Wilkins, H.F. (2005): Floriculture: Principles and Species (2nd Edition). Pearson/Prentice Hall, London, UK</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Todorović, V., Zeljković, S., Moravčević, Đ. (2019): Proizvodnja rasada povrća i cvijeća, Poljoprivredni fakultet Univerziteta u Banjoj Luci</li> <li>2. Scientific and professional papers from relevant journals and databases related to the production of floricultural crops.</li> </ol>		

<b>SEED PRODUCTION IN VEGETABLE AND FLOWER GROWING</b>		
<b>Coordinator</b>	Vlado Guberac	
<b>Collaborators</b>	Sonja Petrović Sonja Vila	
<b>Study year and semester</b>	First year, II. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	L- 75
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to seeds and planting material, as well as the basics of generative and vegetative reproduction for the most important plant species in vegetable and floricultural production. Explain the role of the genetic and breeding foundations of seed production and nursery management, methods for producing seeds and planting material of vegetable and flower species. Evaluation of seed and planting material quality, as well as seedlings and transplants in floriculture and vegetable cultivation.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
After successfully completing the module, the student will be able to: <ol style="list-style-type: none"> <li>1. Plan the production of seed material in vegetable or floricultural production.</li> <li>2. Analyse the economic aspects of profitability in the production of plant reproductive material.</li> <li>3. Conduct quality analyses of seed material in vegetable production and floriculture.</li> <li>4. Compare methods of producing reproductive material in vegetable and flower production.</li> <li>5. Discuss a given topic of vegetable or flower seed production with reasoned and critical analysis.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
In determining the final grade for students, continuous class participation is taken into account (class activity, preparation for class, and reflective analysis of course content) along with an oral exam which is mandatory.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Martinčić, J., Kozumplik, V. (1996): Oplemenjivanje bilja. Udžbenik. Sveučilište u Osijeku i Sveučilište u Zagrebu. (udžbenik)</li> <li>2. Babasaheb B. Desai (2004): Seeds Handbook. Marcel Dekker, Inc.</li> <li>3. Milošević, M, Malešević, M (2004): Semestarstvo I i II. Monografija. Naučni institut za ratarstvo i povrtarstvo, Novi Sad.</li> <li>4. Ujević, A. (1988): Tehnologija dorade i čuvanje sjemena. Fakultet poljoprivrednih znanosti Sveučilišta u Zagrebu.</li> <li>5. During the course, the most recent papers published in reputable international journals will be selected to serve for seminar preparation.</li> </ol>		
<b>Additional literature</b>		

<b>FERTILIZATION IN VEGETABLE GROWING AND FLORICULTURE</b>		
<b>Coordinator</b>	Zdenko Lončarić	
<b>Collaborators</b>	Brigita Popović Vladimir Ivezić	
<b>Study year and semester</b>	First year, II. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	L- 60, P - 10, S – 5
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to the principles and systems of fertilization in vegetable and flower production, the basics of mineral and organic fertilizer production, and the properties of fertilizers and conditioners. By mastering the proposed program, students will be able to independently calculate the required fertilization rate and soil conditioning and become familiar with the basic computer programs used in Croatia.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
After successfully completing the module, the student will be able to:		
<ol style="list-style-type: none"> <li>1. Explain the reasons, tasks, principles, and systems of fertilization in horticulture.</li> <li>2. Classify fertilizers and conditioners according to all classification criteria and explain the industrial production process of mineral fertilizers.</li> <li>3. Describe the chemical properties, nutrient forms, production, and technological properties of all mineral fertilizers used in horticulture.</li> <li>4. Quantify the physical, chemical, and biological properties and suitability of organic fertilizers for horticultural production.</li> <li>5. Quantify the properties and suitability of substrates for horticultural production.</li> <li>6. Calculate the optimal amount and dynamics of nutrient requirements for annual horticultural plant species and the required fertilization.</li> <li>7. Calculate the need for soil conditioning for the cultivation of horticultural plant species.</li> <li>8. Interpret the results of basic soil analyses required for fertilization calculations.</li> <li>9. Explain the methods and interpret the results of basic analyses of soil, mineral, and organic fertilizers.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Eligibility to take the final exam is achieved by accumulating the minimum required number of assessment points. Assessment points are earned based on class attendance (minimum 70 %), participation in class, and grades from partial exams. During the semester, students take two partial exams (in the 7th and 15th weeks of classes). The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade. The final exam is oral.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Lončarić, Z., Parađiković, N., Popović, B., Lončarić, R., Kanisek, J. (2015): Gnojdba povrća, organska gnojiva i kompostiranje. Urednik: Lončarić, Z. Sveučilišni priručnik. Poljoprivredni fakultet Sveučilišta u Osijeku. 123 str.</li> <li>2. Lončarić, Z., Karalić, K. (2015): Mineralna gnojiva i gnojdba ratarskih usjeva. Urednik: Lončarić, Z. Sveučilišni priručnik. Poljoprivredni fakultet Sveučilišta u Osijeku. 120 str.</li> <li>3. Lončarić, Z., Rastija, D., Karalić, K., Popović, B., Ivezić, V., Lončarić, R. (2015.): Kalcizacija tala u pograničnome području. Urednik: Lončarić, Z. Sveučilišni priručnik. Poljoprivredni fakultet Sveučilišta u Osijeku. 75 str.</li> <li>4. Lončarić, Z. (2021): Gnojdba cvijeća. Sveučilište Josipa Jurja Strossmayera u Osijeku Fakultet agrobiotehničkih znanosti Osijek.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Lončarić, Z. (ur.) (2019): Plodnost tala i gospodarenje organskim gnojivima. Osijek. Sveučilište Josipa Jurja Strossmayera u Osijeku, Fakultet agrobiotehničkih znanosti Osijek.</li> <li>2. Lončarić, Z., Rastija, D., Popović, B., Karalić, K., Ivezić, V., Zebec, V. (2014): Uzorkovanje tla i biljke za agrokemijske i pedološke analize. Urednik: Lončarić, Z. Sveučilišni priručnik. Poljoprivredni fakultet Sveučilišta u Osijeku. 56 str.</li> </ol>		

3. Lončarić, Z., Rastija, D., Baličević, R., Karalić, K., Popović, B., Ivezić, V. (2014): Plodnost i opterećenost tala u pograničnom području. Urednik: Lončarić, Z. Sveučilišni priručnik. Poljoprivredni fakultet Sveučilišta u Osijeku. 72 str.
4. Parađiković, N (2009): Opće i specijalno povrćarstvo. Poljoprivredni fakultet Sveučilišta Josipa Jurja Strossmayera u Osijeku.
5. Fink, A. (1982): Fertilizers and fertilization. Introduction and Practical Guide to Crop Fertilization. Verlag Chemie. Weinheim, Florida, Basel.

<b>PARASITIC DISEASES AGENTS OF VEGETABLES AND FLOWERS</b>		
<b>Coordinator</b>	Jasenka Ćosić	
<b>Collaborators</b>	Karolina Vrandečić Tamara Siber	
<b>Study year and semester</b>	First year, II. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	75 (65L+10S )
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce graduate students to the fungi taxonomy, as well as the biology, ecology, and control measures of significant disease-causing agents of vegetables and flowers.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Describe the characteristics of taxonomic units.</li> <li>2. Identify the most significant disease-causing agents in vegetable and flower production.</li> <li>3. Describe the symptoms, biology, and ecology of disease-causing agents.</li> <li>4. Explain the influence of environmental factors and implemented agronomic practices on the occurrence of diseases.</li> <li>5. Compare the symptoms of the same disease-causing agent on different plant species.</li> <li>6. Compare protection measures for the same crop when cultivated in open fields and in greenhouses.</li> <li>7. Plan the implementation of protection measures.</li> <li>8. Discuss, with reasoned and critical analysis, a given seminar topic.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Eligibility to take the final exam is achieved by accumulating the minimum required number of assessment points. Assessment points are earned based on class attendance (minimum 70%), participation in class, and grades from partial exams. During the semester, students take two partial exams (in the 8th and 15th weeks of classes). The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade. The final exam is oral.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Maceljčki, M., Cvjetković, B., Ostojić, Z., Igric Barčić, J., Pagliarini, N., Oštrec, L.J., Barić, K., Čizmić, I. (2004.): Štetočinje povrća. Sveučilište u Zagrebu. Agronomski fakultet, 9-517.</li> <li>2. Jurković, D., Ćosić, J., Vrandečić, K. (2010.): Bolesti cvijeća i ukrasnog bilja. Poljoprivredni fakultet u Osijeku.</li> <li>3. Blancard, D. (2000.). Tomato Diseases. INRA. Manson Publishing, 1-210.</li> <li>4. Stevenson, W.R., Loria, R., Franc, G.D., Weingartner, D.P. (ed.) (2004.): Compendium of Potato Diseases. APS Press, 1-106.</li> <li>5. Schwartz, H.F., Mohan, S. K. (2008.): Compendium of Onion and Garlic Diseases and Pests. APS Press.</li> <li>6. Horst, R.K. (1999.): Compendium of Rose Diseases. APS, St Paul, Minnesota, (5th printing).</li> <li>7. Horst, R.K., Nelson, P.E. (1997.): Compendium of Chrysanthemum Diseases. APS, St. Paul, Minnesota.</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Daughtrey, L.M., Wick, L.R., Peterson, L.J. (1995.): Compendium of Flowering Potted Plant Diseases. APS, St. Paul, Minnesota.</li> </ol>		

<b>INSECTS AND OTHER PESTS IN VEGETABLES AND FLOWERS</b>		
<b>Coordinator</b>	Ankica Sarajlić	
<b>Collaborators</b>	Josipa Puškarić	
<b>Study year and semester</b>	First year, II. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (P+V+S)	75 (55P+20S)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to insects and other pests affecting vegetables and flowers.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
After successfully completing the module, the student will be able to: <ol style="list-style-type: none"> <li>1. Describe the biology and ecology of pests in vegetables and flowers.</li> <li>2. Identify the symptoms of attacks by various harmful organisms in vegetables and flowers.</li> <li>3. Develop integrated pest management strategies for vegetables and flowers.</li> <li>4. Select pesticides based on specific crops and pests.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Eligibility to take the final exam is achieved by accumulating the minimum required number of assessment points. Assessment points are earned based on class attendance (minimum 70%), participation in class, and grades from partial exams. In the second part of the semester, students are required to make an independent seminar paper, which is mandatory. Students have to present their seminar paper orally. During the semester, students take two partial exams. Attending lectures, class participation, the written and presented seminar paper, partial exams, and the final exam are all prerequisites for forming the final grade.		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Ivezić, M. (2008): Entomologija – kukci i ostali štetnici u ratarstvu, Sveučilište Josipa Jurja Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku</li> <li>2. Maceljčki, M., Cjetković, B., Ostojčić, Z., Igrc-Barčić, J., Pagliarini, M., Oštrec, Lj., Barić, K., Čizmić, I. (2004): Štetočinje povrća, Zrinski, Čakovec</li> <li>3. Ivezić M. (2014): Fitonematologija, Sveučilište Josipa Jurja Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku</li> <li>4. Raspudić E., Brmež M., Majić I., Sarajlić A. (2014): Insekticidi u zaštiti bilja, Sveučilište Josipa Jurja Strossmayera u Osijeku, Poljoprivredni fakultet u Osijeku</li> <li>5. Glasilo biljne zaštite (odabrani brojevi)</li> <li>6. Ljerka Oštrec (1998): Zoologija. Zrinski Čakovec</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Raspudić E., Jurković D., Vrandečić K., Štefanić E., Šamota D., Baličević R., Rozman V., Liška A. Ranogajec Lj. (2009): Najznačajniji štetnici, bolesti i korovi u uzgoju povrća, Osječko-baranjska županija</li> <li>2. Scientific papers relevant to each specific thematic unit.</li> </ol>		

<b>ECONOMICS OF VEGETABLE AND FLOWER PRODUCTION</b>		
<b>Coordinator</b>	Ružica Lončarić	
<b>Collaborators</b>	Ljubica Ranogajec Sanja Jelić Milković	
<b>Study year and semester</b>	First year, II. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	L- 60, S – 15
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Provide students with the necessary knowledge about organization, costs, market, and marketing in vegetable and flower production.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Define and analyse the theory of production.</li> <li>2. Identify and explain the types of production costs.</li> <li>3. Interpret cost calculation.</li> <li>4. Calculate the efficiency of labour and machinery during tasks, plan raw materials, and develop production charts.</li> <li>5. Plan costs and calculate production expenses.</li> <li>6. Analyse economic indicators of production and business success.</li> <li>7. Differentiate the structure of agricultural product markets and market factors.</li> <li>8. Identify and analyse all McCarthy's elements of the marketing mix.</li> <li>9. Define the main elements of the communication marketing mix in vegetable and flower production.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
<p>Eligibility to take the final exam is achieved by accumulating the minimum required number of assessment points. Assessment points are earned based on class attendance, participation in class, tasks completed during lectures and seminars, seminar evaluation, and grades from partial exams. During the semester, students are required to make a seminar paper, which is mandatory. Additionally, students take two partial exams during the semester. The final exam is mandatory, and a passing grade on the final exam is a prerequisite for a positive final grade. The final exam can be written or oral.</p>		
<b>Obligatory literature</b>		
<ol style="list-style-type: none"> <li>1. Sikavica, P. (2011): Organizacija, Školska knjiga, Zagreb.</li> <li>2. Karić, M. (2002): Kalkulacije u poljoprivredi, Poljoprivredni fakultet u Osijeku, Osijek.</li> <li>3. Katalog kalkulacija: <a href="http://www.savjetodavna.hr/?page=savje,306,360">http://www.savjetodavna.hr/?page=savje,306,360</a></li> <li>4. Relić, B. (1996): Financijske tablice, Računovodstvo i financije, Zagreb.</li> <li>5. Tolušić, Z. (2007): Tržište i distribucija poljoprivredno-prehrambenih proizvoda (knjiga). Poljoprivredni fakultet u Osijeku, Osijek.</li> <li>6. Meler, M. (2005): Osnove marketinga (knjiga), Ekonomski fakultet u Osijeku. Osijek</li> </ol>		
<b>Additional literature</b>		
<ol style="list-style-type: none"> <li>1. Koester, U. (2020): Foundations of Agricultural Market Analysis and Agricultural Policy, Vahlen Texbooks Munchen</li> </ol>		

<b>PRACTICAL WORK II</b>		
<b>Coordinator</b>	Andrijana Rebekić	
<b>Collaborators</b>		
<b>Study year and semester</b>	Second year, III. semester	
<b>Number of credits and mode of delivery</b>	ECTS credits	6
	Number of hours (L+P+S)	75 (75 P)
<b>COURSE DESCRIPTION</b>		
<b>Course aims</b>	Introduce students to the options for selecting models and methods for the production of vegetables and flowers in greenhouses, tunnels, and open fields, as well as the methods of modern processes within these types of plant production.	
<b>Course enrolment requirements</b>	No prerequisites	
<b>Intended course learning outcomes</b>		
<p>After successfully completing the module, the student will be able to:</p> <ol style="list-style-type: none"> <li>1. List and describe technological methods for the production of vegetables and flowers and categorize them into groups based on the model and method of production.</li> <li>2. Recommend a production technology for a specific type based on agroecological and other environmental conditions, recognizing the advantages and disadvantages of a specific production technology.</li> <li>3. Select and apply a specific production technology or technological process based on the main characteristics of the species, growing medium, and agroecological factors.</li> <li>4. Identify diseases and pests of the mentioned species and implement measures for their control.</li> <li>5. Manage the production process of the mentioned species and apply modern technical management systems. Predict yields and select appropriate markets for the products.</li> </ol>		
<b>Assessment and evaluation of student work during classes</b>		
Students are expected to attend classes regularly and actively participate in tasks during fieldwork. Students are required to keep a work journal documenting all activities during fieldwork, and attendance at fieldwork is mandatory.		
<b>Obligatory literature</b>		
<b>Additional literature</b>		